**UNITED STATES DEPARTMENT OF COMMERCE**
**National Oceanic and Atmospheric Administration**
NATIONAL MARINE FISHERIES SERVICE
525 NE Oregon Street
PORTLAND, OREGON 97232-2737

F/NWR5

June 21, 2002

Lawrence Evans
Attention: Mark Gronceski
US Army Corps of Engineers
1600 Executive Parkway, Suite 210
Eugene, OR 97401

RE: Biological Opinion on the effects of issuing USACE Clean Water Act Section 404 permit #2002-00155 for construction activities at the Walterville Project, McKenzie River, Oregon

Dear Mr. Evans:

Enclosed is the final biological opinion on the U.S. Army Corps of Engineers' (USACE) proposed issuance of Clean Water Act Section 404 permit #2002-00155 for construction activities at Eugene Water & Electric Board's (EWEB) Walterville Project on the McKenzie River, Oregon. This document represents National Marine Fisheries Service's (NMFS) biological opinion on the effects of the proposed action on Upper Willamette River (UWR) chinook salmon and designated critical habitat in accordance with Section 7 of the Endangered Species Act of 1973 (ESA) as amended (16 USC 1531 *et seq*.). This opinion is also being provided to EWEB as the permit applicant.

On September 6, 2001, NMFS and the U.S. Fish and Wildlife Service (USFWS) issued a joint biological opinion on the operation of the Leaburg-Walterville Hydroelectric Project (FERC #2496), including the conservation measures included in EWEB's Biological Report, and license amendments that were developed by NMFS, USFWS, EWEB, and FERC separated staff. On December 18, 2001, FERC issued EWEB an amended license that requires modifications of structures at the Walterville Project.

The proposed construction at the Walterville Project prompted the need for a Clean Water Act Section 404 permit from the USACE. NMFS prepared this biological opinion in response to USACE's April 3, 2002, letter requesting formal consultation on the potential effects of issuing a Clean Water Act Section 404 permit for the Walterville Project construction activities on UWR chinook salmon.

NMFS concludes in this opinion that the proposed construction activities are not likely to jeopardize the continued existence of UWR chinook salmon. The issuance of a Clean Water Act Section 404 permit for the construction activities at the Walterville Project will ultimately

improve passage conditions for UWR chinook salmon through the installation of a fish screen in Walterville Canal and a new adult velocity barrier in the Walterville tailrace. However, NMFS also believes that the proposed action is reasonably certain to result in incidental take of UWR chinook salmon because of the detrimental effects from the capture and release of fish necessary to isolate the in-water work area, increased sediment and possible pollutant levels, and riparian habitat disruption. Thus, NMFS has included in this biological opinion reasonable and prudent measures with non-discretionary terms and conditions that NMFS believes are necessary to minimize the likelihood of incidental take associated with this project.

The enclosed biological opinion contains an analysis of the effects of the proposed action on designated critical habitat. Shortly before the issuance of this opinion, however, a Federal court vacated the rule designating critical for the Evolutionarily Significant Unit considered in this opinion. The analysis and conclusions regarding critical habitat remain informative for our application of the jeopardy standard, even though they no longer have independent legal significance. Also, in the event critical habitat should be redesignated before this action is fully implemented, the analysis will be relevant when determining whether a reinitiation of consultation would be necessary at that time. For these reasons and the need to timely issue this opinion, our critical habitat analysis has not been removed from this opinion.

This opinion also serves as consultation on Essential Fish Habitat pursuant to Section 305(b) of the Magnuson-Stevens Fishery Conservation Management Act and its implementing regulations (50 CFR 600). This concludes formal consultation on the action outlined in the USACE's request. Due to the limited time frame in which to complete construction activities this season, we encourage the USACE to expedite, if possible, the issuance of the 404 permit to EWEB so that construction can be completed on schedule.

We appreciate your cooperation in completing this consultation. Please contact Mindy Simmons of my Hydro Division staff at 503-872-2854 if you have any questions about this consultation.

Sincerely,

D. Robert Lohn
Regional Administrator

cc: Chris Allen, USFWS
Laurie Power, EWEB
Jeff Ziller, ODFW
James Hastreiter, FERC
Dan Cary, DSL

Endangered Species Act
Section 7 Consultation

# BIOLOGICAL OPINION

**and**

# MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT CONSULTATION

on the Effects of Issuance of a USACE Section 404 Permit for Construction Activities at the Walterville Project in the McKenzie Subbasin, on Upper Willamette River Chinook Salmon

| | |
|---|---|
| Action Agency: | U.S. Army Corps of Engineers |
| Consultation Conducted by: | National Marine Fisheries Service<br>Northwest Region<br>Hydro Program |
| NMFS Log Number: | F/NWR/2002/00646 |
| Date Issued: | June 21, 2002 |

# TABLE OF CONTENTS

## LIST OF FIGURES

# LIST OF TABLES

# 1. OBJECTIVE

Section 404 of the Clean Water Act requires an individual to obtain authorization from the U.S. Army Corps of Engineers (USACE) for the discharge or removal of fill into all waters of the United States, including wetlands. Section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (ESA) requires Federal agencies, including the USACE, to consult with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS), as appropriate, to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat.

The Leaburg-Walterville Hydroelectric Project (FERC Project No. 2496) is located on the McKenzie River in Lane County approximately 20 miles east of the Eugene/Springfield metropolitan area. Figure 1-1 provides a map of the McKenzie River subbasin, showing the location of the Leaburg-Walterville Hydroelectric Project. The Federal Energy Regulatory Commission (FERC) licenses the Leaburg-Walterville Hydroelectric Project, which is owned and operated by the Eugene Water & Electric Board (EWEB). On September 6, 2001,[1] NMFS and USFWS (the Services) issued a joint biological opinion on the operation of the Leaburg-Walterville Project, under the 1997 FERC license, as reinstated and amended by FERC order dated April 27, 2000; the conservation measures as proposed in the Biological Assessment (BA) submitted by FERC; and the revised and updated license articles developed by NMFS, USFWS, EWEB, and FERC separated staff. On December 18, 2001, FERC issued a new license to EWEB that requires EWEB to make numerous modifications at the Walterville Hydroelectric Project to exclude adult and juvenile fish from the Walterville Canal.

The proposed construction at the Walterville Project prompted a need for a Section 404 permit from the USACE. EWEB submitted an application for a Section 404 permit with the USACE on February 15, 2002, for its proposed construction activities at the Leaburg-Walterville Project. The USACE's proposed issuance of a 404 permit for construction activities at the Walterville Hydroelectric Project is the subject of this Endangered Species Section 7 (a)(2) formal consultation between NMFS and the USACE.

The objective of this biological opinion is for NMFS to determine whether the USACE's proposed issuance of a Section 404 permit for EWEB's construction activities at the Walterville Hydroelectric Project in the McKenzie River subbasin, as defined in Chapter 3, is likely to jeopardize the continued existence of ESA-listed species, or result in the destruction or adverse modification of designated critical habitat. The standards for determining jeopardy are set forth in Section 7(a)(2) of the ESA as defined by 50 CFR §402 (the consultation regulations).

[1] The August 28, 2001, draft revised and updated license articles were used to define the related portions of the proposed action in this biological opinion.

Procedures for conducting consultation under Section 7 of the ESA are further described in the Services' Consultation Handbook (USFWS and NMFS 1998). The general steps for conducting a jeopardy analysis, which correspond with the organization of this biological opinion, are described below. Formal consultation is concluded with the final issuance of this opinion.

In order for NMFS to determine whether the action is likely to jeopardize the listed species and/or destroy or adversely modify designated critical habitat, it must perform an analysis of effects that 1) defines the biological requirements and current status of the listed species (Chapter 4); 2) describes the effects of the environmental baseline within the action area (Chapter 5); 3) evaluates the effects of the proposed action on the listed species (Chapter 6); 4) considers the cumulative effects of the future state, tribal, local, or private actions that are reasonably likely to certain to occur within the action area (Chapter 7); and, 5) determines if the proposed action, together with the environmental baseline and cumulative effects, is likely to jeopardize the continued existence of the listed species within an evolutionarily significant unit (ESU) or result in the destruction or adverse modification of its designated critical habitat (Chapter 8). If the effects of the proposed action, taken together with the cumulative effects and baseline, are found to jeopardize the listed species, or destroy or adversely modify critical habitat, then NMFS must identify any reasonable and prudent alternatives to the proposed action that will avoid jeopardy or adverse modification of critical habitat.

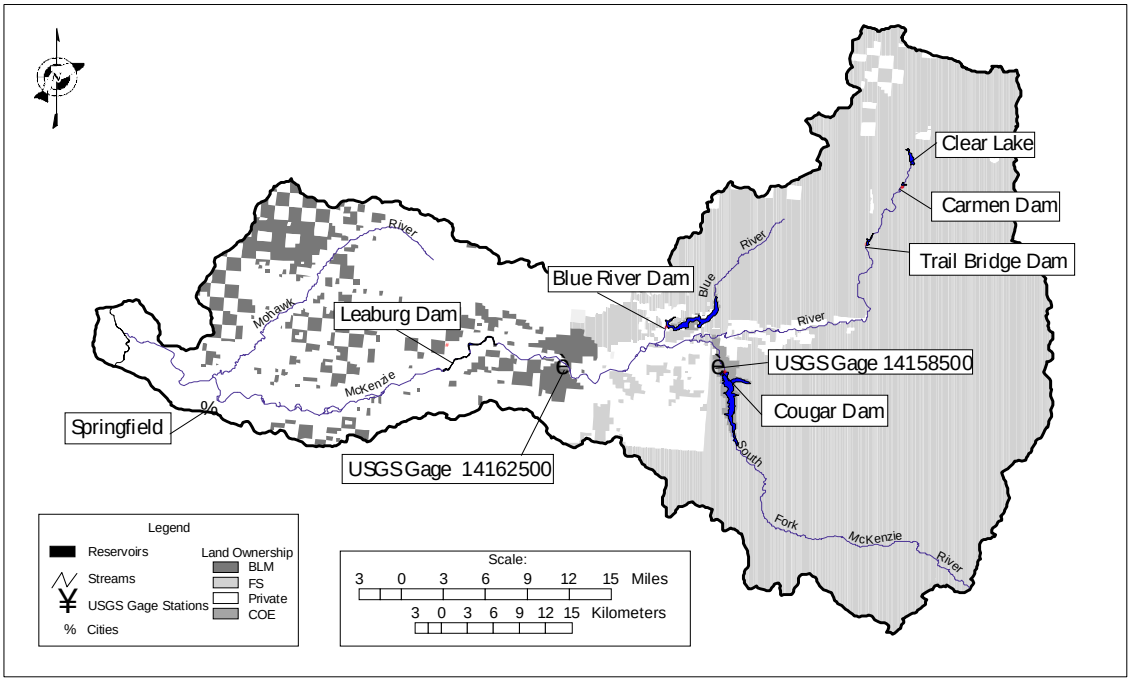


Figure 1-1. The McKenzie River subbasin, showing locations of EWEB and USACE projects.

## 1.1 General Approach for Jeopardy Analysis

As stated above, NMFS must determine whether the action is likely to jeopardize the continued existence of the listed species and ESU, and/or whether the action is likely to destroy or adversely modify designated critical habitat. NMFS defines an action that is "likely to jeopardize the continued existence of ..." as one "that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." NMFS defines "destruction or adverse modification" as "a direct or indirect alteration that appreciably diminishes the value of critical habitat for the survival and recovery of a listed species" (50 CFR §402.02). For salmonids, NMFS has interpreted the implementing regulations as requiring a high likelihood of survival and moderate to high likelihood of recovery when the proposed action is combined with mortality in other life stages (see Section 1.3.1.1 in NMFS 2000a).

The framework used to apply a jeopardy analysis in any given Section 7 consultation varies depending on the type of action analyzed and the availability of information regarding the effects of the action on listed species. Biological requirements may be expressed either in terms of survival rates and metrics indicating population viability or as habitat conditions necessary to ensure the continued existence of the species (NMFS 1999). NMFS asserts that these two approaches are equivalent based on studies that identify causal links between habitat modifications and population characteristics such as abundance, productivity, and diversity. This causal relationship can be quantified under certain specific conditions (e.g., Spence et al. 1996), although site-specific information is not available in the context of most Section 7 consultations. In these instances, NMFS must rely on data that can be reasonably extrapolated to the action area and to the populations in question.

In the case of this biological opinion, elements of the environmental baseline, the proposed action, and/or cumulative effects affect both direct (passage) survival at the projects and the ability of the system to provide other biological requirements (food, shelter, flow regime, substrate, etc.) of listed species. That is, the abiotic habitat processes of disturbance, flow regime, sediment and large wood (LW) function, riparian vegetation and floodplain function, and water quality (Section 2.3.3.1 in NMFS and USFWS 2001) support the fluvial (channel, riparian, and floodplain) ecosystem and, as such, create and maintain habitat for all fluvial species. NMFS uses a habitat-based framework to link effects on habitat processes with effects on the biological processes of listed species and thus their likelihood of survival and recovery. Where critical habitat has been designated (e.g., for Upper Willamette River [UWR] chinook salmon), NMFS also evaluates effects of the proposed action on its constituent elements. Cause and effect linkages between effects of the proposed action on the habitat processes and on the biological requirements of listed species are addressed in Chapter 6.

NMFS has determined that, for the purposes of this biological opinion, for UWR chinook salmon, there is enough information to quantitatively evaluate the likelihood of survival and

recovery of the ESU. NMFS uses the techniques established by its Cumulative Risk Initiative to describe the status of the McKenzie River subbasin population under the environmental baseline and makes simple, determinative assumptions about the effect of the proposed action to estimate the effect on survival from one generation to the next. The purpose of this analysis is to determine whether mortality that can be attributed to the action is below a level that, when combined with mortality occurring in other life stages, results in a high likelihood of survival and a moderate to high likelihood of recovery.

In the application of this standard, NMFS relies on all the best available scientific information. However, NMFS recognizes that there is still substantial uncertainty in its projections of the likelihood of survival and recovery. As a result, NMFS relies on this analysis primarily to provide a standardized measure of risk against which to judge the significance of the action to the continued existence of the ESU. In the end, NMFS' determination of consistency with ESA Section 7(a)(2) is qualitative, informed to the extent possible by standardized quantitative analysis.

### 1.1.1 Metrics and Criteria Used for Assessing Jeopardy Standard

This section describes metrics integral to NMFS' quantitative evaluation of the likelihood of survival and recovery for UWR chinook salmon.

#### 1.1.1.1 Metrics Indicative of Survival

For the survival component of the jeopardy standard, a measurement of the risk of absolute extinction (no more than one fish returning over the number of years in a generation) within 100 years is relevant (McClure *et al.* 2000b). NMFS evaluates the status of the species relative to a standardized criterion of 5% probability of absolute extinction in assessing whether the species has a high likelihood of survival under the proposed action. A 100-year period captures both short- and long-term risk because a population that has a certain probability of extinction within a short time frame, such as 24 years, will have at least that probability of extinction in 100 years. NMFS also reviews a 24-year period for two reasons: 1) because the range of uncertainty around an estimate of the 100-year metric is quite large and 2) because there is potential to further modify the action in the near term through the adaptive management process (if monitoring and evaluation indicate a need for further action to avoid longer-term risks). Absolute extinction is used instead of a quasi-extinction level because of the unambiguous interpretation of this criterion, whereas quasi-extinction levels such as 20, 50, or 100 fish have different meanings for populations of different sizes and capacities in different river systems.

#### 1.1.1.2 Metrics Indicative of Recovery

The recovery metric stated in the 1995 FCRPS Biological Opinion (NMFS 1995) is a relevant measure of the status of the species relative to the recovery component of the jeopardy standard.

This recovery metric is defined as the likelihood that the 8-year geometric mean abundance of natural spawners in a population will be equal to or greater than an identified recovery abundance level. Recovery abundance levels have not been finally determined for UWR chinook salmon. Until recovery levels are determined, NMFS will rely on a combination of the survival criterion and an alternate recovery criterion defined as the level of improvement needed in the productivity of the population to result in a median annual population growth rate (lambda) greater than 1.0 over 48 years. NMFS applies this alternative recovery metric because the recovery abundance level may not yet be specified, but it is certainly higher than the current abundance level. Therefore, at a minimum, a population must be increasing at least slightly to recover.

## 1.2 Spatial and Temporal Scales of the Jeopardy Analysis

In this biological opinion, NMFS looks at both short-term and long-term and small and large spatial-scale effects of the proposed action on direct survival at the projects and on habitat and related biological processes. Actions lasting for even a short period of time, or affecting only a small portion of the action area, can have some degree of adverse effect on habitat processes that support numbers, reproduction, and distribution. NMFS must use its professional judgment to determine whether this type of adverse effect, when added to the current status of the species and its habitat in the action area (environmental baseline) and to the effects of other foreseeable non-Federal actions (cumulative effects), would be sufficiently significant to constitute jeopardy.

## 1.3 Application of the Basinwide Strategy in the Absence of Recovery Plans

This opinion is a formal consultation between NMFS and the USACE as required under Section 7 of the ESA. It is not a recovery plan for UWR chinook salmon. Recovery planning to meet ESA requirements for listed species in the Willamette Basin is underway. Recovery plans for listed species call for quantified de-listing goals, measures necessary to meet those goals, and estimates of the time and cost required to carry out those measures.

In May 2000, NMFS convened a Technical Recovery Team (TRT) to develop de-listing goals for UWR chinook salmon, UWR steelhead, Lower Columbia River (LCR) steelhead, LCR chinook salmon, and Columbia River (CR) chum salmon. The TRT has developed draft products for comanager review. The process of identifying measures needed in each stage of the anadromous salmonid life cycle for recovery of the ESUs will involve additional stakeholders, and NMFS is in the process of convening a formal group to address that aspect of recovery planning.

## 1.4 Term of this Biological Opinion

The issuance of a Section 404 permit to EWEB constitutes the USACE's "proposed action." Therefore, the term of this biological opinion is equal to the duration of permit coverage. Construction at the Walterville Hydroelectric Project began in May 2002 and will continue

through late December 2002. This biological opinion will be effective through the completion of all construction activities covered by the issued 404 permit.

# 2. BACKGROUND

This chapter identifies the listed species likely to be affected by the proposed action, and describes the consultation history of the Leaburg-Walterville Project and the relationship of this biological opinion to previous biological opinions.

## 2.1 Listed Species

A total of seven species occurring in the McKenzie subbasin are currently listed under the ESA. Of these species, the UWR chinook salmon is within the jurisdiction of NMFS. Because the USACE's BA concluded that the proposed action is likely to adversely affect UWR chinook salmon, the USACE requested formal consultation with NMFS.

The listing of anadromous salmonids under the ESA is complicated by intraspecific diversity and historical hatchery practices. Populations that meet NMFS' interpretation of the ESA's criteria for a "Distinct Population Segment" are designated as ESUs (NMFS 1991). An ESU is often composed of a seasonal run of both native hatchery- and naturally-produced fish of a given species, located within a discrete geographic area below natural barriers; the UWR chinook salmon ESU includes hatchery- and naturally-produced spring chinook salmon above Willamette Falls and in the Clackamas River subbasin. However, only the naturally-spawned fish are protected under the ESA because of their small numbers. Most spring chinook that currently pass Willamette Falls are hatchery-produced and these adults are not protected even though they are part of the UWR chinook salmon ESU (64 FR 14308). Fall chinook salmon above Willamette Falls are not native (i.e., they did not occur there naturally before the first fishway was built in 1885); thus, they are not part of the UWR chinook salmon ESU. In summary, in this opinion, the term "UWR chinook salmon" refers only to the naturally-spawned, spring-run component of the ESU.

## 2.2 Consultation History and Relationship to Other Biological Opinions

In 1997, FERC issued a license to EWEB for operation of the Leaburg-Walterville Hydroelectric Projects. On April 27, 2000, FERC issued an Order on Remand to amend the license to include NMFS' fishway prescriptions, but ESA consultation had not yet been completed. On May 25, 2000, NMFS requested rehearing from FERC, since the April 27, 2000, Order was issued without ESA consultation. On February 14, 2001, FERC requested formal consultation with NMFS, and the Services issued a joint biological opinion on September 6, 2001, addressing effects of project operation on listed species in the project area. On September 7, 2001, EWEB, NMFS, and USFWS submitted a settlement agreement to FERC. On December 18, 2001, FERC approved the settlement agreement and incorporated it and the terms and conditions of the biological opinion into EWEB's new license. The September 6, 2001, biological opinion addressed both short- and long-term effects of the new license on ESA-listed species and associated critical habitat. However, detailed construction plans for structural modifications at

the project were not available at the time the biological opinion was issued. Thus, the opinion did not address the effects of specific construction activities on listed species. Since the issuance of the 2001 biological opinion, EWEB has completed construction plans and plans to begin construction during spring and summer 2002.

On February 15, 2002, the USACE and the Division of State Lands (DSL) received a Section 404 (Clean Water Act) permit application from EWEB for construction activities at the Leaburg-Walterville Project. Along with the application, EWEB submitted detailed construction plans for the structural modifications required by the new license and a biological report describing the project's effects on listed species. The USACE submitted EWEB's Biological Report (EWEB 2002) with its request for formal consultation. On May 10, 2002, NMFS issued a biological opinion titled The Effects of Issuance of a USACE Section 404 Permit for Construction Activiites at the Leaburg Dam Fish Ladders in the McKenzie Subbasin, on Upper Willamette River Chinook Salmon (Leaburg Dam Fish Ladders biological opinion).

On March 21, 2001, NMFS issued a Programmatic Biological Opinion on 15 Categories of Construction Requiring Department of the Army Permits in Oregon (15 Categories Programmatic Opinion). In the 15 Categories Programmatic Opinion, reasonable and prudent measures were outlined for 15 specific categories of construction activities frequently requiring permits from the USACE (NMFS 2001). Most of the proposed construction at the Leaburg-Walterville Project corresponds to one or more categories covered by the 15 Categories Programmatic Opinion. Whenever possible, reasonable and prudent measures from the 15 Categories Programmatic Opinion were incorporated into EWEB's application for a Section 404 permit for construction activities at the Walterville Project.

# 3. PROPOSED ACTION

The USACE proposes to issue wetlands fill permit #2002-00155 under Section 404 of the Clean Water Act to EWEB for construction activities at the Walterville Project. This proposal is the subject of this ESA Section 7 consultation. The following sections contain a brief description of the Leaburg-Walterville Project and more detailed descriptions of the specific construction activities at the Walterville Project to be covered under the proposed permit.

## 3.1 Description of the Leaburg-Walterville Project

The design and operation of the Leaburg-Walterville Hydroelectric Project, described in detail in the Leaburg-Walterville relicensing BA (FERC 2001) and hereby incorporated by reference, are briefly summarized below. The project consists of the Leaburg and Walterville developments, two separate hydroelectric facilities operated independently of one another. The Leaburg Dam and powerhouse are approximately 28 and 23 miles, respectively, east of the Eugene/Springfield metropolitan area. The Walterville Canal intake and powerhouse are approximately 17 and 13 miles, respectively, east of the metropolitan area.

The Leaburg development was completed in 1930 and consists of a dam, a 5-mile-long, 15-foot deep unlined canal (Leaburg Canal), forebay, penstocks, powerhouse, tailrace, and substation. Leaburg Dam is a reinforced concrete and steel structure approximately 400 feet long and 22 feet high. The dam is equipped with three 100-foot by 9-foot rollgates, a sluiceway, and intake gates that divert water from the McKenzie River. The impounded area behind the Leaburg Dam (Leaburg Lake) extends about 1.5 miles upstream and covers an area of about 57 acres. Water diverted at the dam for power generation passes through a downstream migrant fish screen facility and enters the Leaburg Canal leading to the Leaburg forebay and powerhouse. The downstream migrant fish screen structure is located near the head end of the canal and consists of three steel V-shaped screen bays.

The Walterville development was completed in 1911 and consists of a headworks, a 4-mile-long, 14-foot deep unlined canal (Walterville Canal), a pumped storage pond, a forebay, a penstock, an automated powerhouse, a tailrace, and a substation. Water inflow to the canal is controlled by a headworks structure containing two 13-foot by 20-foot taintor gates. At most river flows, water from the McKenzie River is diverted by gravity without the use of a dam or river obstruction. The cut-and-fill unlined canal, widened and deepened in 1949 to its present dimensions, originates on the right bank (facing downstream) of the McKenzie River and flows westerly into the forebay. Water is returned from the powerhouse to the McKenzie River through a two-mile tailrace canal, part of which is an old meander channel of the river.

The Leaburg-Walterville Project is operated on a base load, run-of-the-river basis. River flows are partially controlled upstream by USACE facilities. Under normal operation, approximately 2,500 cfs is diverted into either project canal from the McKenzie River, with the balance of flow

(in compliance with minimum flows imposed by FERC license conditions) continuing down the main river channel. As flows recede, diversion into the canals is reduced to maintain the licensed minimum in the river. The Leaburg-Walterville Project diverts water from two sections of the McKenzie River: 1) a 5.8-mile stretch of river between the Leaburg Dam and the point of confluence with the Leaburg tailrace, referred to as the Leaburg bypass reach; and 2) a 7.3-mile section between the Walterville intake and the point of confluence with the Walterville tailrace, referred to as the Walterville bypass reach.

The Leaburg development is equipped with a fish ladder and screen operated year-round to allow passage of fish both upstream and downstream around the dam. The ladders needs occasional cleaning, which usually can be accomplished with a one- or two-day shutdown. The right bank ladder is being replaced this summer, and the left bank ladder will be modified next summer to increase passage effectiveness. Routine maintenance is scheduled at times of lowest upstream fish migration. The Walterville development does not currently have a fish screen at the canal intake. Canal flow restrictions and/or complete intake closures are used to provide some protection to downstream migrating juvenile salmon.

The December 18, 2001, amended FERC license requires EWEB to install a fish screen at the Walterville canal intake, and to construct a new tailrace velocity barrier in the tailrace. The license also requires numerous modifications be made to the canal intake structure. The construction schedule for these structures, also required by the FERC license, requires that construction at the Walterville Project be completed by December 23, 2002.

## 3.2 Description of Proposed Action

The proposed action in this biological opinion is the issuance of a USACE 404 permit for dredge and fill activities as described in EWEB' 404 permit application (Appendix A), filed on February 14, 2002, for FERC-approved structures at the Walterville Project. EWEB's permit application also included construction activities at the Leaburg Dam fish ladders. NMFS issued a biological opinion on the effects of construction at the Leaburg Dam fish ladders on May 10, 2002, and the USACE subsequently issued a 404 permit. Specific construction activities at the Walterville Project (including identification of activities involving in-river work) are described below, categorized by project location. The USACE's 404 permit will include a requirement that EWEB implement its "Proposed Measures to Avoid, Minimize, and Mitigate for Construction-related Impacts" (referred to as EWEB's Proposed Measures). These measures are considered part of the proposed action.

### 3.2.1 Walterville Canal Intake

The USACE's 404 permit will allow EWEB's work at the Walterville Canal intake to proceed in the following sequence:

1.) Installation of silt curtain and cofferdam at the upstream end of the canal
2.) Reconstruction and biostabilization of the upstream section of the right (north) bank of the canal for approximately 350 ft. below the breakwater structure with a vegetated rock-faced geogrid
3.) Relocation of silt curtain and construction of the barb-breakwater structure on the right (east) side of the intake mouth
4.) Construction of small cofferdam and replacement of the boat ramp
5.) Relocation of silt curtain and recontouring and armoring of the left (west) side canal intake tip

Construction at the Walterville Canal intake will begin with the installation of a silt curtain and construction of a cofferdam at the head of the canal to dewater the canal entrance. To remove all fish from the area downstream of the cofferdam (including the canal), EWEB will perform a fish salvage operation in accordance with the ODFW-approved fish salvage plan required by FERC license Article 422. The silt curtain will be relocated twice to accommodate construction of the boat ramp and the westside intake tip. The only in-river work consists of construction, relocation, and removal of the cofferdams and silt curtains.

### 3.2.2 Walterville Fish Screen, Fish Bypass, and Fish Evaluation Facility

The USACE's 404 permit will allow EWEB's work at the Walterville Canal fish screen, bypass, and evaluation facility to proceed in the following sequence:

1.) Installation of a new fish screen approximately 500 feet below the canal headgate
2.) Cutting and removal of pavement down Partridge Lane to install a 2,200-foot long, 54-inch diameter fish bypass pipeline
3.) Construction the fish evaluation facility at the bypass outfall at the end of Partridge Lane into the McKenzie River

Construction of the new fish screen will occur about one-third mile downstream of the canal entrance, and is located approximately 500 ft. below the canal headgate. Construction will begin after the canal headgates have been closed and a fish salvage operation has been performed. Thus, construction of the fish screen and bypass facility will be completed within the dewatered area or on land. The fish bypass outfall and evaluation facility will occur on the bank of the McKenzie River and will involve some in-river work.

### 3.2.3 Walterville Rock-Drop Weir Diversion Structures

The USACE's 404 permit will allow EWEB's construction of the rock-drop diversion structures in the north channel and in the small channel between Rodman and Kaldor islands to proceed in the following sequence:

1.) Removal of an existing riprap berm at the head of the north channel's northern end
2.) Crossing the north channel (in the wet) with construction equipment to access Rodman Island
3.) Crossing Rodman Island via a primitive road with construction equipment to access the construction site in the small channel between Rodman and Kaldor islands

4.) Removal of existing bed and bank material in locations of new structures (in the wet)
5.) Installation of new rock-drop weir structures (in the wet)

Construction of the rock-drop weir diversion structures will consist primarily of in-river work in the north channel of the McKenzie River and within the small channel between Rodman and Kaldor islands.

### 3.2.4 Walterville Tailrace Excavation

The USACE's 404 permit will allow EWEB's construction at the Walterville Tailrace to proceed in the following sequence:

1.) Construction of a temporary access road down the tailrace bank
2.) Excavation and removal of rock material to deepen the tailrace for approximately 500 ft. below the powerhouse and immediately above the Camp Creek bridge

All work will be performed in the canal after dewatering and fish salvage operations have occurred. No in-river work will occur.

### 3.2.5 Walterville Tailrace Barrier Construction

Construction of the Walterville tailrace barrier will proceed in the following sequence:

1.) Construction of a cofferdam at the upstream end of the adult bypass channel
2.) Construction of a temporary sedimentation pond and straw-bale filter below the construction area
3.) Demolition of the existing fish rack structure
4.) Construction of the new tailrace velocity barrier
5.) Installation of gabion walls for approximately 900 feet (right bank) and 600 feet (left bank) above the barrier to raise the height of the tailrace banks to hold the water backed up by the new velocity barrier
6.) Removal of cofferdam at upstream end of adult bypass channel

A cofferdam will be constructed at the top of the adult fish bypass channel, and the Walterville Canal will be dewatered. Thus, all construction in the vicinity of the tailrace barrier will be performed in a dewatered area. The temporary cofferdam at the upstream end of the adult bypass

channel will prevent most water from entering the project area from the bypass channel. Any groundwater that seeps into the project area will be filtered in the temporary sedimentation pond and straw-bale filter prior to leaving the project site and entering the river. Aside from construction and removal of the cofferdam in the adult bypass channel, no in-river work will occur.

## 3.3 Environmental Protection

EWEB included numerous environmental protection measures as part of its proposed action in its Section 404 application. EWEB copied many of these measures from the Terms and Conditions of NMFS' 15 Categories Programmatic Opinion (dated March 21, 2001) on the effects of the USACE issuing permits for 15 categories of construction activities, described in Section 2.2. NMFS' 15 Categories Programmatic Opinion did not cover construction at the Walterville Project primarily because site constraints forced siting of the two staging areas within 150 feet of the river. Due to the close proximity of the two contractor staging areas to the river, EWEB proposed an additional project oversight and enforcement action (Section 3.3.2) to enforce the measures presented in Section 3.3.1.

### 3.3.1 EWEB's Proposed Measures to Avoid, Minimize, and Mitigate for Construction-related Impacts

EWEB proposed the following conservation measures in its Section 404 permit application. EWEB copied many of these measures from NMFS' 15 Categories Programmatic Opinion (dated March 21, 2001) on the effects of the USACE issuing permits for 15 categories of construction activities, described in Section 2.2.

a. Project design. EWEB will avoid, minimize, and mitigate impacts to natural resources from construction activities. The following overall project design conditions will be met.
   i. Minimum area. Construction impacts will be confined to the minimum area necessary to complete the project.
   ii. In-water work. Wherever possible, work within the active channel of all anadromous fish-bearing streams, or in systems which could potentially contribute sediment or toxicants to downstream fish-bearing systems, will be completed within the ODFW approved in-water work period[2]. Due to the length of time necessary to complete some of the facilities, some in-water construction will occur outside the in-water work guidelines, based on the schedule in Attachment 6-A (of the application attached here as Appendix A) that was developed in consultation with ODFW specifically

[2] Oregon Department of Fish and Wildlife, *Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources*, 12 pp (June 2000)(identifying work periods with the least impact on fish) (http://www.dfw.state.or.us/ODFWhtml/InfoCntrHbt/0600_inwtrguide.pdf).

for construction at the Leaburg and Walterville projects, and which was approved previously by NMFS, USFWS and FERC.

(1) Work period extensions. If EWEB needs to extend the in-water work period from those identified in Attachment 6-A (of the application), including those for work outside the wetted perimeter of the stream but below the ordinary high water mark, the extensions must be approved by biologists from the Services.

(2) Isolation of in-water work area. During in-water work, if listed fish may be present, including incubating eggs or juveniles, and the project involves either significant channel disturbance or use of equipment instream, EWEB will ensure that the work area is well isolated from the active flowing stream within a cofferdam (made out of sandbags, sheet pilings, inflatable bags, gravel berm, etc.), or similar structure, to minimize the potential for sediment entrainment. The exceptions are the upper and lower diversions (rock drop weir structures), which need to be placed in flowing water to ensure proper elevation to divert flows to the Walterville canal, ensure proper elevations to set the 1-foot drop in water elevation between the rock weirs, and to ensure that enough small rock, i.e. gravel and fines, are present in the boulders so water does not pass through the weirs, trapping fish. Furthermore, no ground or substrate disturbing action will occur within the active channel 300 feet upstream of potential spawning habitat as measured at the thalweg without isolation of the work area from flowing waters.

   (a) Fish screen. Any water intake structure authorized under an Opinion issued by the Services must have a fish screen installed, operated and maintained in accordance to NMFS' fish screen criteria.[3]

   (b) Seine and release. Prior to and intermittently during pumping, EWEB will attempt to seine and release fish from the work isolation area as is prudent to minimize risk of injury.

      (i) Seining will be conducted by or under the supervision of EWEB's fishery biologist and all staff working with the seining operation will have the necessary knowledge, skills, and abilities to ensure the safe handling of all ESA-listed fish.

      (ii) ESA-listed fish will be handled with extreme care

[3] Nation Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria for Pump Intakes* (May 9, 1996)(guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

and kept in water to the maximum extent possible during seining and transfer procedures. Any transfer of ESA-listed fish will be conducted using a sanctuary net that holds water during transfer, whenever necessary to prevent the added stress of an out-of-water transfer.

(iii) Seined fish will be released as near as possible to capture sites.

(iv) If EWEB transfers any ESA-listed fish to third-parties other than the Services personnel, EWEB will secure written approval from the Services.

(v) EWEB will obtain any other Federal, state, and local permits and authorizations necessary for the conduct of the seining activities.

(vi) EWEB will allow the Services or their designated representatives to accompany field personnel during the seining activity, and allow such representative to inspect EWEB's seining records and facilities.

(vii) A description of any seine and release effort will be included in a post-project report, as described below under measure g. ii.

(c) Sediment-laden or contaminated water pumped from the work isolation area will be discharged into an upland area where practicable providing over-ground flow prior to returning to the canal or river. Discharge will occur in such a manner as not to cause erosion. For areas where no upland area is present, e.g. the right bank fish ladder, EWEB will assure the discharge is filtered prior to being returned to the river and filtered material is not released back to the river upon removal. EWEB will not discharge into potential fish spawning areas or areas with submerged vegetation.

iii. Fish passage. Work will not inhibit passage of any adult or juvenile salmonid species throughout the construction period or after project completion. All culvert and road designs will comply with ODFW guidelines and criteria for stream-road crossings[4] with appropriate grade controls to prevent culvert failure due to changes in stream elevation. EWEB's construction activities will not modify channels that could

[4] Appendix A, Oregon Department of Fish and Wildlife Guidelines and Criteria for Stream-Road Crossings, in: G.E. Robison, A. Mirati, and M. Allen, *Oregon Road/Stream Crossing Restoration Guide: Spring 1999* (rules, regulations and guidelines for fish passage through road/stream crossings under the Oregon Plan) (http://www.nwr.noaa.gov/1salmon/salmesa/4ddocs/orfishps.htm).

adversely affect fish passage, such as by increasing water velocities.

iv. Pollution and erosion control plan. A Pollution and Erosion Control Plan (PECP) will be developed for each authorized project to prevent point-source pollution related to construction operations. For the Leaburg and Walterville construction activities, EWEB is required to develop and submit for FERC approval a PECP for construction and operation as described in license article 401. In addition to meeting the license article requirements, EWEB ensures the PECP will contain the pertinent elements listed below and meet requirements of all applicable laws and regulations:

(1) Methods that will be used to prevent erosion and sedimentation associated with access roads, stream crossings, construction sites, borrow pit operations, haul roads, equipment and material storage sites, fueling operations and staging areas.

(2) Methods that will be used to confine and remove and dispose of excess concrete, cement and other mortars or bonding agents, including measures for washout facilities.

(3) A description of the hazardous products or materials that will be used, including inventory, storage, handling, and monitoring.

(4) A Spill Containment and Control Plan with notification procedures, specific clean up and disposal instructions for different products, quick response containment and clean up measures that will be available on-site, proposed methods for disposal of spilled materials, and employee training for spill containment.

(5) Measures that will be taken to prevent construction debris from falling into any aquatic habitat. Any material that falls into a stream during construction operations will be removed in a manner that has a minimum impact on the streambed and water quality.

v. Temporary access roads. EWEB will design temporary access roads as follows:

(1) Existing roadways or travel paths will be used whenever reasonable.

(2) A helicopter survey conducted with ODFW during the 2001 spawning season located spawning habitat; where stream crossings are essential, EWEB will avoid any spawning habitat within 1,000 feet upstream and downstream.

(3) No stream crossings will occur at known or suspected spawning areas or within 300 feet upstream of such areas where impacts to spawning areas may occur.

(4) Where stream crossings are essential, EWEB's crossing design will accommodate reasonably foreseeable risks (e.g., flooding and associated bedload and debris) to prevent diversion of streamflow out of the channel and down the road in the event of crossing

failure.

(5) EWEB vehicles and machinery will cross riparian areas and streams at right angles to maintain the main channel wherever reasonable.

(6) EWEB's temporary roads within 150 feet of streams will avoid, minimize and mitigate soil disturbance and compaction by clearing vegetation to ground level and placing clean gravel over geotextile fabric.

(7) EWEB will minimize the number of stream crossings.

vi. Treated wood removal. EWEB will use the following precautions regarding removal of treated wood.

(1) No treated wood debris will fall into the water. If treated wood debris does fall into the water, it will be removed immediately.

(2) All treated wood debris will be disposed of at an approved disposal facility for treated wood.

(3) If treated wood pilings will be removed, EWEB will ensure these conditions are followed:

(a) Pilings to be removed will be dislodged with a vibratory hammer, or other means acceptable to the Services..

(b) Once loose, the pilings will be placed onto the construction barge or other appropriate dry storage location, and not left in the water or piled onto the stream bank.

(c) If pilings break during removal, the remainder of the submerged section will be left in place.

(d) Long- term disposal of the piles must be at an approved disposal area for hazardous materials of this classification.

(e) Projects involving pile removal require long-term monitoring to ensure that if altered currents expose more pile, it must also be removed.

vii. Cessation of work. EWEB will cease all project operations, except efforts to minimize storm or high flow erosion, under high flow conditions that may result in inundation of the project area.

b. Pre-construction activities. EWEB will undertake the following actions prior to significant alteration of the action area.

i. Boundaries of the clearing limits associated with site access and construction will be flagged to prevent ground disturbance of critical riparian vegetation, wetlands and other sensitive sites beyond the flagged boundary.

ii. The following erosion control materials will be on-site.

(1) A supply of erosion control materials (e.g., silt fence and straw bales) will be on hand to respond to sediment emergencies. Sterile straw or hay bales will be used when available to prevent

introduction of weeds.

(2) An oil absorbing, floating boom will be available on-site during all phases of construction whenever surface water is present.

iii. All temporary erosion controls (e.g., straw bales, silt fences) will be in-place and appropriately installed downslope of project activities within the riparian area. Effective erosion control measures will be in-place at all times during the contract, and will remain and be maintained until such time that permanent erosion control measures are effective.

c. Heavy Equipment. EWEB will restrict use of heavy equipment as follows.

i. When heavy equipment is required, EWEB will use equipment having the least impact (e.g., minimally sized, rubber tired).

ii. Heavy equipment will be fueled, maintained and stored as follows.

(1) All equipment that is used for instream work will be cleaned prior to operations below the bankfull elevation. External oil and grease will be removed, along with dirt and mud. No untreated wash and rinse water will be discharged into streams and rivers without adequate treatment.

(2) Place vehicle staging, maintenance, refueling, and fuel storage areas a minimum of 50' horizontal distance from Walterville canal and the McKenzie River for construction of Walterville velocity barrier and Walterville fish screen, and a minimum of 50' horizontal distance from the McKenzie River for the Leaburg left bank fish ladder modification. The staging, etc. areas for Leaburg right bank fish ladder reconstruction will be within 50' of the McKenzie River. The Pollution and Erosion Control Plan developed under Section a.iv. will prevent point-source pollution of the river.

(3) All vehicles operated within 150 feet of any stream or water body will be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected will be repaired before the vehicle resumes operation.

(4) When not in use, vehicles will be stored in the vehicle staging area.

d. Site preparation. EWEB will prepare the site preparation the following manner, including removal of stream materials, topsoil, surface vegetation and major root systems.

i. To the extent practicable, any instream large wood or riparian vegetation that is moved or altered during construction will stay on-site or be replaced with a functional equivalent.

ii. EWEB will minimize clearing and grubbing within 150 feet of any stream occupied by listed salmonids during any part of the year, or within 50 feet of any stream not occupied by listed salmonids.

iii. Tree removal will be strictly limited.

(1) All perennial and intermittent streams: Trees (3 inches diameter at breast height or greater) will be removed from within 150 feet horizontal distance of the ordinary high water mark only when necessary for construction of approved facilities. All trees that will be removed will be flagged.

(2) Tree removal will be mitigated for on-site by a 2:1 replanting ratio.

iv. Whenever the project area is to be revegetated or restored, EWEB will stockpile native channel material, topsoil and native vegetation removed for the project for redistribution on the project area.

e. Earthwork. EWEB will complete earthwork, including drilling, blasting, excavation, dredging, filling and compacting, in the following manner:

i. Boulders, rock, woody materials and other natural construction materials used for the project will be obtained from outside of the riparian area.

ii. During excavation, native streambed materials will be stockpiled above the bankfull elevation for later use. If riprap is placed, native materials will be placed over the top of the riprap.

iii. Material removed during excavation will only be placed in locations where it cannot enter streams or other water bodies.

iv. All exposed or disturbed areas will be stabilized to prevent erosion.

(1) Areas of bare soil within 150 feet of waterways, wetlands or other sensitive areas will be stabilized by native seeding,[5] mulching, and placement of erosion control blankets and mats, if applicable, quickly as reasonable after exposure, but within 7 days of exposure.

(2) All other areas will be stabilized quickly as reasonable, but within 14 days of exposure.

(3) Seeding outside of the growing season will not be considered adequate nor permanent stabilization.

v. All erosion control devices will be inspected during construction to ensure that they are working adequately.

(1) Erosion control devices will be inspected daily during the rainy season, weekly during the dry season, monthly on inactive sites.

(2) If inspection shows that the erosion controls are ineffective, work crews will be mobilized immediately, during working and off-hours, to make repairs, install replacements, or install additional controls as necessary.

(3) Erosion control measures will be judged ineffective when turbidity plumes are evident in waters occupied by listed salmonids during

[5] By Executive Order 13112 (February 3, 1999), Federal agencies are not authorized to permit, fund or carry out actions that are likely to cause, or promote, the introduction or spread of invasive species. Therefore, only native vegetation that is indigenous to the project vicinity, or the region of the state where the project is located, shall be used.

any part of the year.

vi. If soil erosion and sediment resulting from construction activities is not effectively controlled, EWEB will limit the amount of disturbed area to that which can be adequately controlled.

vii. Sediment will be removed from sediment controls once it has reached 1/3 of the exposed height of the control. Whenever straw bales are used, they will be staked and dug into the ground 5 inches (12 cm). Catch basins will be maintained so that no more than 6 inches (15 cm) of sediment depth accumulates within traps or sumps.

viii. Sediment-laden water created by construction activity will be filtered before it enters a stream or other water body. Silt fences or other detention methods will be installed as close as reasonable to culvert outlets to reduce the amount of sediment entering aquatic systems.

f. Site restoration. EWEB will restore and clean up the site, including protection of bare earth by seeding, planting, mulching and fertilizing, in the following manner.

i. All damaged areas will be restored to pre-work conditions including restoration of original streambank lines, and contours.

ii. All exposed soil surfaces, including construction access roads and associated staging areas, will be stabilized at finished grade with mulch, native herbaceous seeding, and native woody vegetation prior to October 1. On cut slopes steeper than 1:2, a tackified seed mulch will be used so that the seed does not wash away before germination and rooting occurs. In steep locations, a hydro-mulch will be applied at 1.5 times the normal rate.

iii. Disturbed areas will be planted with native vegetation specific to the project vicinity or the region of the state where the project is located, and will comprise a diverse assemblage of woody and herbaceous species.

iv. Plantings will be arranged randomly within the revegetation area.

v. All plantings will be completed prior to April 15.

vi. No herbicide application will occur within 300 feet of any stream channel as part of this permitted action. Undesired vegetation and root nodes will be mechanically removed.

vii. No surface application of fertilizer will be used within 50 feet of any stream channel.

viii. Fencing will be installed as necessary to prevent access to revegetated sites by livestock or unauthorized persons.

ix. Plantings will achieve an 80 percent survival success after three years.

(1) If success standard has not been achieved after 3 years, EWEB will submit an alternative plan to the COE. The alternative plan will address temporal loss of function.

(2) Plant establishment monitoring will continue and plans will be submitted to the COE until site restoration success has been

achieved.

g. Monitoring: Construction. Within 30 days of completing the project, EWEB will submit a monitoring report to the COE, Oregon Division of State Lands (DSL), and the Services describing EWEB's success in carrying out the proposed measures to avoid, minimize, and mitigate for construction-related impacts. This report will consist of the following information.

i. Project identification.
   (1) applicant's name;
   (2) project name;
   (3) construction activity;
   (4) compensatory mitigation site(s) (if any) by 5th field HUC and latilong;
   (5) starting and ending dates for work performed; and
   (6) EWEB's contact person.

ii. Isolation of in-water work area. All projects involving isolation of in-water work areas will include a report of any seine and release activity including:
   (1) The name and address of the supervisory fish biologist;
   (2) methods used to isolate the work area and minimize disturbances to ESA-listed species;
   (3) stream conditions prior to and following placement and removal of barriers;
   (4) the means of fish removal;
   (5) the number of fish removed by species;
   (6) the location and condition of all fish released; and
   (7) any incidence of observed injury or mortality.

iii. Pollution and erosion control. Copies of all pollution and erosion control inspection reports, including descriptions of any failures experienced with erosion control measures, efforts made to correct them and a description of any accidental spills of hazardous materials will be submitted.

iv. Treated wood pilings. Any project involving removal of treated wood pilings will include the name and address of the approved disposal area and the plan for long-term monitoring to ensure that if altered currents expose more pile, it will also be removed.

v. Site restoration. Documentation of the following conditions:
   (1) Finished grade slopes and elevations.
   (2) Log and rock structure elevations, orientation, and anchoring, if any.
   (3) Planting composition and density.
   (4) A plan to inspect and, if necessary, replace failed plantings and structures for a period of five years.

vi. A narrative assessment of the project's effects on natural stream function.

vii. Photographic documentation of environmental conditions at the project site and compensatory mitigation site(s) (if any) before, during and after project completion.

(1) Photographs will include general project location views and close-ups showing details of the project area and project, including pre and post construction.

(2) Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.

(3) Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

### 3.3.2 Oversight and Enforcement of EWEB's Proposed Measures

EWEB will have two full-time Montgomery Watson Harza (MWH) inspectors in the field monitoring construction practices, including compliance with EWEB's Proposed Measures, and the PECP.[6] Implementation of the FERC-required Quality Control Inspection Program (QCIP)[7] is designed to ensure environmental compliance quality control. The QCIP requires monthly progress reports regarding quality control of environmental protection measures, including the following: discussion of erosion control and other measures and their effectiveness; discussion of any instances where sediments or other construction discharges entered the stream(s); the extent of the discharges, an assessment of any damage to the stream(s); and corrective actions taken, including measures to prevent further problems. EWEB will also perform periodic, random site visits throughout the work period, accompanying the MWH inspectors on-site inspections and ensuring thorough inspection and enforcement of environmental measures. EWEB will send email summary reports of these visits to NMFS.

EWEB will also enforce the following items from the Pollution and Erosion Control Details and Requirements found in sheet ES-1 of each contract document:

- Items 2 and 7: Requires the contractor to adjust the approved PECP as required for field conditions,
- Item 9: Requires contractor inspection of erosion control facilities after significant rainfall events,
- Items 15 and 6: EWEB can halt construction if the contractor is not maintaining proper

[6]In an email dated April 30, 2002, EWEB amended its proposed action to include these oversight measures.

[7]The Quality Control Inspection Program (QCIP) is a general requirement of FERC, not specific to the Leaburg-Walterville License.

erosion and pollution control measures and the contractor is responsible for payment of any agency-imposed fines.

# 4. BIOLOGICAL INFORMATION

As described in Section 2.1, the UWR chinook salmon ESU includes both hatchery- and naturally-produced spring chinook salmon above Willamette Falls and in the Clackamas River, but only naturally-produced fish are protected under the ESA. This section discusses the location of detailed information on the biological requirements of UWR chinook salmon and describes the major factors of decline in this ESU.

## 4.1 Biological Requirements

Information regarding this species' distribution, population trends, life history, spawning, rearing and outmigration, ocean stage, and age at maturity was included in Chapter 4 of NMFS' May 10, 2002, Leaburg Dam Fish Ladder biological opinion, and that information is hereby incorporated by reference[8].

## 4.2 Factors for Decline

### 4.2.1 Habitat and Hydrology

Human activities have had enormous effects on salmonid populations in the Willamette drainage. The Willamette River, once a highly braided river system, has been dramatically simplified through channelization, dredging, and other activities that have reduced rearing habitat (i.e., stream shoreline) by as much as 75%. In addition, the construction of 37 dams in the basin has blocked access to over 700 km of stream and river spawning habitat. Some of these dams also alter the temperature regime of the Willamette and its tributaries, affecting the timing of development of naturally-spawned eggs and fry. Water quality is also affected by agricultural and urbanization on the valley floor, as well as timber harvesting in the Cascade and Coast ranges, which contribute to increased erosion and sediment load in Willamette basin streams and rivers. The disappearance in the 1920s and 1930s of the June run was associated with a dramatic decline in water quality in the lower Willamette River. The fall run in the Clackamas River was extirpated during this same time period.

### 4.2.2 Hatcheries

Hatchery production began in the basin during the late nineteenth century. Eggs were transported throughout the basin so that, in terms of genotype, current populations are relatively homogeneous (although still distinct from those of surrounding ESUs). Hatchery production continues in the Willamette, with an average of 8.4 million smolts and fingerlings released each

[8]The May 10, 2002 Leaburg Dam Fish Ladders biological opinion can be obtained from the NMFS Northwest Region website: http://www.nwr.noaa.gov

year into the main river or its tributaries between 1975 and 1994. Hatcheries are currently responsible for most of the production (90% of escapement) in the basin.

The Clackamas River currently accounts for about 20% of the production potential in the Willamette River basin with fish originating from one hatchery plus natural production areas primarily above the North Fork Dam. The interim escapement goal for that area is 2,900 fish (ODFW 1998a). However, the Clackamas River system is so heavily influenced by hatchery production that it is difficult to distinguish spawners of natural stock from hatchery origin fish. Approximately 1,000 to 1,500 adults have been counted at the North Fork Dam in recent years.

### 4.2.3 Other Factors for Decline

Harvest on this ESU has been high, both in the ocean and in-river. The total in-river harvest below Willamette Falls during 1991 through 1995 averaged 33% (and previously had been much higher in some years). Ocean harvest was estimated as 16% for 1982 through 1989. Total (marine and freshwater) harvest rates on UWR spring-run stocks were reduced considerably for the 1991 through 1993 brood years, to an average of 21% (ODFW 1998b).

# 5. ENVIRONMENTAL BASELINE

The "environmental baseline" is defined in the ESA Section 7 implementing regulations as:

> "the past and present impacts of all Federal, State, or private actions and other human activities in an action area, the anticipated impacts of all proposed Federal projects in an action area that have already undergone formal or early Section 7 consultation, and the impact of State or private actions that are contemporaneous with the consultation in process" (50 CFR §402.02).

The Consultation Handbook (USFWS and NMFS 1998) further states that the environmental baseline is:

> "an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat (including designated critical habitat), and ecosystem within the action area. The environmental baseline is a 'snapshot' of a species' health at a specified point in time."

These definitions illustrate that the environmental baseline is more than the current condition of physical habitat within the action area. The environmental baseline is the progression of the physical, chemical, and biological conditions within the action area over time that has resulted in the current status of the listed species. This section therefore includes a discussion of the status of the habitat and biological processes within the action area under the environmental baseline, describing how pre-project conditions have been modified or transformed into current conditions.

## 5.1 Action Area and Basin Description

The "action area" for a consultation is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR §402.02). Because of the upstream (e.g., recycling of marine-derived nutrients) and downstream effects of the continued operation of the Leaburg-Walterville Project, the action area encompasses the entire McKenzie River subbasin (Fig. 1-1), excluding areas above EWEB's Trail Bridge Dam and USACE's Cougar and Blue River dams in the headwaters of the McKenzie, and extending down to the confluence with the Willamette River.

The McKenzie River subbasin covers an area of approximately 1,300 square miles on the western slope of the Cascade Mountains, and the mainstem is approximately 90 miles long. The major tributaries are the South Fork McKenzie, Blue, and Mohawk rivers (Fig. 1-1). The McKenzie River originates high on the western slopes of the Cascade Range. Much of the McKenzie River subbasin is mountainous with steep ridges and a narrow band of level land in the valleys along the McKenzie and Mohawk rivers. Although the mainstems of the McKenzie River and the Mohawk River have relatively low gradients, most of the other tributaries have

steep gradients in their upper reaches. The headwaters of the McKenzie River are characterized by a broad, gently sloping volcanic ridge that extends west from the steep peaks of the Three Sisters Mountains.

The profile of the upper river generally reflects the transition from resistant volcanic parent material through the more easily erodible tuffaceous sedimentary rock and glacial landforms. The channel slope decreases from 1.2% upstream of Belknap Springs to less than 0.4% through the glacial valley just upstream from the mouth of Blue River. Downstream of Blue River the channel slope remains between 0.2 to 0.4%, but the channel is tightly confined within a narrow canyon for approximately 20 miles. The slope flattens abruptly to less than 0.2% as the river enters the wide Willamette Valley.

The largest town in the subbasin is Springfield (population approximately 52,000; PSU 1998), which is also partially located in the upper Willamette and Middle Fork Willamette subbasins. There are several smaller towns and a large number of rural residents in the subbasin. The largest dams are USACE's Cougar Dam on the South Fork McKenzie (RM 4.5; completed in 1963) and Blue River Dam on the Blue River (RM 1.8; completed in 1968). The other major dams in the subbasin are EWEB's Carmen and Trail Bridge dams on the upper McKenzie River, Smith Dam on the Smith River, and Leaburg Dam on the lower McKenzie River (Fig. 1-1). In addition, EWEB diverts a large proportion of the lower McKenzie River into the unscreened Walterville Canal. Other dams and diversions withdraw water from the lower McKenzie River and its tributaries in significant amounts during the summer and fall. The floodplains and channels of the lower McKenzie and its tributaries have been simplified by riprapping and filling for agriculture, urban development, highways, and other development (EA 1991a).

Approximately 70% of the McKenzie River subbasin is public land; most of the upper subbasin is managed by Willamette National Forest (WNF) and a much smaller proportion of the subbasin is managed by the Bureau of Land Management's Eugene District (BLME). The headwaters originate in the Three Sisters Wilderness area of WNF. Cougar and Blue River dams, and most of their reservoirs, are located within WNF (Fig. 1-1). Forest road construction and timber harvest have been extensive on both public and private land in the McKenzie River subbasin. The subbasin is used extensively for recreational purposes, and the McKenzie River is one of the most popular rivers for fishing and boating in Oregon. Much of the lower McKenzie River subbasin is described in watershed analysis reports by BLME (1995, 1996, 1998), EWEB (EA 1991a, 1991b), and Weyerhaeuser (Weyco 1994). Watersheds in the upper basin are described in watershed analysis reports by WNF (WNF BRRD 1994, 1996, 1998; WNF MRD 1995, 1997). In addition, the McKenzie Watershed Council (MWC) has completed an assessment of water quality and habitat for the entire subbasin (MWC 1996).

## 5.2 Status of Habitat Processes Under the Environmental Baseline

The proposed action affects the processes (described in Section 2.3.3.1 in NMFS 2001) that create and sustain habitat parameters required by listed species within the McKenzie River subbasin. The habitat processes relevant to this proposed action are disturbance, flow regime, sediment and LW function, riparian vegetation and floodplain function, and water quality. The status of these five habitat processes under the environmental baseline was described in Chapter 5 of the May 10, 2002, Leaburg Dam Fish Ladders biological opinion, and that discussion is hereby incorporated by reference.[9]

## 5.3 Status of Biological Processes of UWR Chinook Salmon Under the Environmental Baseline

The proposed action affects the biological processes of UWR chinook salmon. The most relevant biological processes for listed species in the McKenzie subbasin ecosystem covered by this opinion are migration, spawning, rearing, population level processes, and food web dynamics.

In this opinion, the biological process of migration is defined as movement of an organism from one habitat to another, either for its next life history stage or in response to seasonal changes. Spawning is defined as breeding behavior and activity as well as incubation of eggs. Rearing is defined as the life history stage between emergence from incubation habitat to smoltification (for anadromous salmonids) or to development of the subadult form. Population level processes are defined as the number of reproductively mature adults within a given geographic area, survival rates of various life stages, and life history diversity (intra-population variation in the timing or location of one or more life history stages, such as the spawning of spring chinook salmon in different stream reaches and during different weeks or months within the same subbasin). Food web dynamics is a very broad community level process that encompasses the interactions of species in the McKenzie subbasin ecosystem with one another, and includes predation, competition, and disease.

The status of these five biological processes under the environmental baseline was described in Chapter 5 of the May 10, 2002, Leaburg Dam Fish Ladders biological opinion, and that discussion is hereby incorporated by reference.[10]

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[9]The May 10, 2002 Leaburg Dam Fish Ladders biological opinion can be obtained from the NMFS Northwest Region website: http://www.nwr.noaa.gov

[10]The May 10, 2002 Leaburg Dam Fish Ladders biological opinion can be obtained from the NMFS Northwest Region website: http://www.nwr.noaa.gov

## 5.4 Completed Consultations in the McKenzie River Subbasin Affecting the Environmental Baseline

McKenzie Hydroproject

On November 15, 1999, the Services completed a joint biological opinion for FERC on the proposed licensing of the McKenzie Hydroelectric Project (FERC Project No. 11512), owned by Mr. John Bigelow. The Services concluded in the biological opinion that the proposed licensing was not likely to jeopardize the continued existence of listed CR bull trout or UWR chinook salmon. The issuance of a new license for the project will reduce adverse conditions for CR bull trout and UWR chinook salmon through installation of a protective screening and bypass system.

Cougar Reservoir Water Temperature Control

On March 8, 2000, the Services completed a joint biological opinion for USACE on the effects of constructing the proposed water temperature control project at Cougar Dam (Cougar WTC) on the South Fork McKenzie River on listed UWR chinook salmon, CR bull trout, and the northern spotted owl. Cougar Dam is part of USACE's Willamette Project. The purpose of the Cougar WTC Project is to retrofit the dam with a control tower that will give the USACE better control over the temperature of water releases from Cougar Dam. The construction of the water temperature control tower is scheduled for 2002 through 2004 with preliminary work beginning in 2001. The project is expected to provide a long-term benefit to the two listed fish species in the project area (UWR chinook salmon and CR bull trout) by reducing effects on water temperature downstream in the South Fork and mainstem McKenzie rivers. However, an unexpectedly large release of turbidity (fine sediment and colloidal materials) from Cougar Dam during the spring 2002 drawdown for the water temperature control project changed the baseline condition for turbidity in the McKenzie River downstream of its confluence with the South Fork McKenzie. The effects of suspended sediment and turbidity on fish are reported in the literature as ranging from beneficial to detrimental (see section 6.1.1.1). Key factors that determine the potential for detrimental effects are the season, frequency, and duration of exposure. Turbidity in the 25-50 Nephalometric Turbidity Units (NTU) range reduced growth and caused more juvenile coho salmon and steelhead to emigrate from hatchery streams than in clear water (Sigler et al. 1984). Turbidity readings at the USGS gage located one-half mile downstream of Cougar Dam exceeded 30 NTU on 56 days during the initial drawdown in spring 2002. The duration of increased turbidity caused by the drawdown was likely greater than that resulting from an average high flow event. NMFS expects the environmental baseline of UWR chinook salmon to be degraded relative to turbidity.

Willamette Basin Hatchery Program

On July 14, 2000, NMFS completed a biological opinion for USACE and BPA on the effects of collection, rearing, and release of salmonids associated with artificial propagation programs in the Willamette Basin on listed UWR chinook salmon and UWR steelhead (UWR steelhead do not occur in the McKenzie subbasin). USACE and BPA fund over 90% of the artificial propagation programs that potentially affect these two listed species as mitigation for loss of

habitat for these species from the construction and operation of the Willamette Project. The hatcheries themselves are operated by the ODFW. The artificial propagation programs included in the July 14, 2000, biological opinion are located in the Clackamas, North Santiam, and McKenzie river subbasins. The biological opinion requires the USACE and BPA to implement measures to reduce interbreeding between hatchery-origin and natural-origin fish in areas where natural spawning occurs, to help develop more locally-adapted hatchery stocks, to reduce impacts to wild fish populations from hatchery broodstock collection, and to reduce harvest rates on natural-origin fish (by creating an opportunity for selective harvest through marking of all hatchery fish). The incremental survival improvement resulting from the selective fishery is discussed in Section 5.3.4 in NMFS (2002).

Leaburg-Walterville Hydroelectric Projects

On September 6, 2001, the Services issued a biological opinion on the effects of FERC issuing a new license to EWEB for operation of the Leaburg-Walterville Hydroelectric Projects. The terms and conditions of the biological opinion were incorporated into the new license FERC issued on December 18, 2001. Articles in the new license and terms and conditions of the biological opinion require that EWEB make numerous modifications to the physical structure and operation of the Leaburg-Walterville Project that will have beneficial effects on UWR chinook salmon. As license articles are implemented, FERC will ensure that EWEB takes all available measures at the Leaburg-Walterville Project to reduce the effects of the projects on factors that currently limit the productivity of the ESU:

- Direct passage mortality of chinook salmon smolts entrained into the Walterville Canal and powerhouse will be reduced to less than 0.5%
- Mortality of chinook salmon fry through the Leaburg fish screen facility when debris is on the screen or in the apex will be reduced to a consistent 2 to 4% by system modifications and revised maintenance procedures
- Attraction and delay of adult chinook in the tailrace of each project will be reduced or eliminated by the construction of tailrace barriers and delay will further be reduced by modifying the left bank fish ladder and redesigning and reconstructing the right bank fish ladder at Leaburg Dam to meet current design criteria
- Actions designed to increase the power generation capacity of the Leaburg and Walterville hydropower facilities (Leaburg lake raise and Walterville tailrace excavation) will be taken in a manner that does not increase direct or indirect effects on listed fish
- EWEB will maintain instantaneous minimum flows immediately downstream of Leaburg Dam and the Walterville intake at a continuous level of 1,000 cfs, maintaining current migration conditions for juvenile UWR chinook salmon
- Until the Walterville Canal is screened, EWEB will seasonally augment the minimum 1,000 cfs flow in the Walterville bypass reach to reduce the likelihood that migrating juvenile chinook salmon will be entrained into the Walterville Canal and powerhouse
- EWEB will operate the Leaburg-Walterville Project to meet a seasonal set of ramping rate criteria in the river below the Walterville tailrace and downstream from the Leaburg

and Walterville diversions. Assuming that Walterville pond will be used in the future for power peaking (i.e., after the effects of fluctuating river levels in the McKenzie River downstream of the Walterville tailrace outfall are determined), EWEB operation of the pond will be governed by the ramping rate criteria included in the schedule

- EWEB will develop gravel and spawning and rearing habitat enhancement programs in a manner that implements the MWC's Conservation Strategy (currently under development)

Leaburg Dam Fish Ladders Construction

As discussed in Chapter 2, on May 10, 2002, NMFS issued a biological opinion for the USACE on the effects of issuing a 404 permit for construction activities at the Leaburg Dam fish ladders. Construction at the Leaburg Dam fish ladders began in May 2002, and will continue through November 2003. This construction will be concurrent with the construction activities discussed in this biological opinion at the Walterville Project during 2002 and will result in substantial improvements to fish passage at Leaburg Dam.

## 5.5 Biological Requirements of UWR Chinook Salmon in Action Area

For UWR chinook salmon, NMFS has determined that the species obtains its biological requirements during these life history stages through access to essential features of critical habitat. Essential features include adequate 1) substrate (especially spawning gravel), 2) water quality, 3) water quantity, 4) water temperature, 5) water velocity, 6) cover/shelter, 7) food, 8) riparian vegetation, 9) space, and 10) migration conditions (65 FR 773). The sections below list the essential features of critical habitat for UWR chinook salmon for each of the relevant habitat types within the action area.

### 5.5.1 Relevant Critical Habitat Types for Chinook Salmon in Action Area

#### 5.5.1.1 Juvenile Rearing Areas

Essential features of critical habitat for juvenile chinook salmon rearing areas include adequate water quality, water quantity, water velocity, cover/shelter, food, riparian vegetation, space, and safe passage conditions. The requirement for adequate substrate, although relevant to incubation of redds in the mainstem, is discussed under spawning areas, below.

#### 5.5.1.2 Juvenile Migration Corridors

Essential features of critical habitat for juvenile chinook salmon migration corridors include adequate water quality, water quantity, water velocity, cover/shelter, food, riparian vegetation, space, and migration conditions.

#### 5.5.1.3 Areas for Growth and Development to Adulthood

Essential features of critical habitat for juvenile chinook salmon areas for growth and development to adulthood include all the essential features of critical habitat for juvenile rearing areas (above).

#### 5.5.1.4 Adult Migration Corridors

Essential features of critical habitat for adult chinook salmon migration corridors include all the essential features of critical habitat for juvenile migration corridors (above), although the threshold for adequate food may be lower than or different from that of juveniles in the migration corridor or of fish occupying areas for growth and development to adulthood.

#### 5.5.1.5 Spawning Areas

Essential features of critical habitat for chinook salmon spawning areas include all the essential features of critical habitat for juvenile rearing areas (above), with the addition of adequate substrate and the exception of adequate food.

### 5.5.2 Adequacy of Habitat Conditions for UWR Chinook Salmon in Critical Habitat in Action Area

Regulations implementing Section 7(a)(2) of the ESA define "destruction or adverse modification" as "a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species." Adverse effects on a constituent element of critical habitat generally do not result in a determination of "adverse modification" unless that loss, when added to the environmental baseline, is likely to result in an appreciable decline in the value of the critical habitat for both the survival and the recovery of the listed species (50 CFR §402.02).

Quantitatively defining a level of adequacy through specific, measurable standards is difficult for many of these biological requirements. In many cases, the absolute relationship between the critical element and species survival is not clearly understood, thus limiting development of specific, measurable standards. Some parameters are generally well known in the fisheries literature (e.g., thermal tolerances). For other action-area biological requirements, the effects of any adverse impacts on essential features of critical habitat are considered in more qualitative terms.

## 5.6 Biological Requirements and the Current Baseline

Based on all the information above, not all of the habitat and biological requirements of UWR chinook in the action area are being met under the environmental baseline. The status of this

species is such that there must be a significant improvement in the habitat and biological conditions they experience over those currently available under the environmental baseline to meet their biological requirements for survival and recovery.

# 6. ANALYSIS OF EFFECTS ON LISTED SPECIES AND CRITICAL HABITAT

The NMFS ESA implementing regulations define "effects of the action" as "the direct and indirect effects of an action on the species or critical habitat together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline." Direct effects are immediate effects of the project on the species or its habitat, and indirect effects are those that are caused by the proposed action and are later in time, but are reasonably certain to occur (50 CFR §402.02).

The proposed action addressed in this biological opinion is the issuance of a USACE 404 permit that allows construction at the Walterville Project. This biological opinion discusses the direct and indirect effects of these construction activities. The effects of the operation of the modified Walterville Project have been addressed in a previous biological opinion (NMFS and USFWS 2001). NMFS determined that construction of the new tailrace barrier will significantly reduce migration delay of adult chinook salmon. Operation of the new fish screen will exclude juveniles from the Walterville Canal, greatly increasing juvenile survival through the project.

## 6.1 Effects of the Action

The primary adverse impacts on UWR chinook salmon and its habitat likely to result from the proposed action include 1) mortality or injury of fish during the fish salvage operation; 2) an increase in suspended sediment and turbidity from the in-river construction work; 3) the possibility of chemical contaminants or hazardous material (gasoline, oil, grease, concrete) entering the river in the event of a spill; and 4) temporary and permanent loss of wetland and riparian habitat. EWEB's construction schedule (Appendix A) was created in collaboration with ODFW, NMFS, and USFWS. The schedule received written approval from ODFW on July 23, 2001, and received approval from the Services in their settlement agreement signed on September 7, 2001. The approved construction schedule is required by FERC license article 403. The expected effects of each construction activity are addressed below.

<u>Walterville Canal Fish Salvage Operation</u>

The proposed construction at EWEB's Walterville Project consists of several components, as described in Chapter 3. Most of the proposed construction activities require dewatering of the Walterville Canal. In accordance with FERC license article 422, EWEB developed a detailed Fish Salvage Plan that was approved by ODFW on April 16, 2002, and submitted to FERC on April 17, 2002. In order for EWEB to adhere to its construction schedule that was developed in coordination with NMFS, USFWS, and ODFW, and is now required by FERC as license article 403, the fish salvage operation began prior to issuance of the USACE 404 permit. According to information provided to NMFS by EWEB, the fish salvage operation began on May 1, 2002, and was completed by May 20, 2002. Temporary fish screens were placed over the canal headgates to prevent new fish from entering the canal system as the canal and tailrace were gradually dewatered over a two week period. As the water level in the canal and tailrace dropped, fish

were rescued and relocated by implementing the precautionary measures for handling ESA-listed fish outlined in EWEB's Proposed Measure (a.)(ii.)(b.) and the ODFW-approved Fish Salvage Plan. These guidelines were developed to minimize, to the maximum extent possible, harm to listed fish during capture, handling, and transport.

EWEB rescued 10,356 wild chinook salmon fry (Age 0+) from the Walterville canal, and 25 wild chinook smolts. The mortality rate of age 0+ fish was 1.6% (170 fish), with no known mortality of the smolts. EWEB estimates its capture efficiency at 95%, resulting in an estimated 500 juveniles that were not recovered and will likely perish in isolated pools remaining in the canal as water temperatures increase over the summer. All live juvenile chinook salmon were released into the McKenzie River (pers. comm., Tim Downey, EWEB, Eugene, OR).

### 6.1.1 Walterville Canal Intake

Construction at the Walterville Canal intake involves several steps. Many of these construction activities will be performed in the dewatered area behind one of two cofferdams. The silt curtains will be relocated twice to isolate different construction areas.

#### 6.1.1.1 Cofferdam Construction

The contractor will first install a cable-mounted silt curtain anchored with ecology blocks across the canal intake prior to construction. Then a cofferdam of clean gravel (from the Walterville fish screen excavation) will be constructed behind the silt curtain across the canal intake and the area between the cofferdam and the canal headgates will be dewatered using the techniques described in the Fish Salvage Plan. The silt curtain and gravel cofferdam will be constructed between July 1 and July 4, 2002, which is within the preferred ODFW in-river work window. The silt curtain will later be moved to contain the entire canal intake and location of the new boat ramp.

<u>Direct Injury</u>
The in-river construction of the cofferdam will take place in July which is during the upstream migration. Thus, adult chinook salmon could be present in the vicinity of the cofferdam. Although juvenile outmigration will not be occurring during the cofferdam construction period, rearing juveniles are likely to be present in the project area and could be directly affected by in-river work and the cofferdam fish salvage operation. There is a risk of direct mechanical injury of fish during cofferdam construction if fish encounter equipment during in-river work, but NMFS considers this risk to be low, as fish should avoid equipment in the water and utilize other parts of the river. The area between the cofferdam and canal headgates will be dewatered with a screened pump, and fish salvage behind the cofferdam will be performed in accordance with EWEB's Proposed Measure (a.)(ii.)(2), utilizing the techniques described in the ODFW-approved Fish Salvage Plan. Thus, construction of the cofferdam, installation of the silt curtain, and the fish salvage operation behind the cofferdam could result in some direct lethal and non-

lethal (i.e., injury) impacts on adult and juvenile UWR chinook salmon, either due to direct mechanical injury from construction equipment, or during the salvage operation.

Water Quality

Installation of the silt curtain and construction of the gravel cofferdam will dislodge fine particles in the existing bed material of the river and increase suspended sediment levels (turbidity) in the river downstream of the construction site. In addition, any fine particles still remaining in the clean gravel for the cofferdam will become suspended during cofferdam construction. This increase in turbidity will result in temporary, minor negative effects on salmonid habitat and could result in direct injury or mortality to fish present in the project area. The presence of a silt curtain will minimize the likelihood of suspended sediment from reaching the McKenzie River.

The effects of suspended sediment and turbidity on fish are reported in the literature as ranging from beneficial to detrimental (see below). Elevated total suspended solids (TSS) conditions have been reported to enhance cover conditions, reduce piscivorous fish/bird predation rates, and improve survival. Elevated TSS conditions have also been reported to cause physiological stress, reduce growth, and adversely affect survival. Of key importance in considering the detrimental effects of TSS on fish are the season, frequency, and duration of the exposure (not just the TSS concentration).

Behavioral avoidance of turbid waters may be one of the most important effects of suspended sediments (DeVore et al. 1980; Birtwell et al. 1984; Scannell 1988). Salmonids have been observed to move laterally and downstream to avoid turbid plumes (McLeay et al. 1984, 1987; Sigler et al. 1984; Lloyd 1987; Scannell 1988; Servizi and Martens 1991). Juvenile salmonids tend to avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, except when the fish need to traverse these streams along migration routes (Lloyd et al. 1987). Gregory and Levings (1988) reported that turbidity also provides refuge and cover from piscivorous fish and birds. In systems with intense predation pressure, this benefit (i.e., enhanced survival) may balance the cost of detrimental physical effects (i.e., reduced growth). Turbidity levels of about 23 NTU have been found to minimize predation risk (Gregory 1993).

Exposure duration is a critical determinant of the occurrence and magnitude of physical or behavioral effects (Newcombe and MacDonald 1991). Salmonids have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with flood events, and are adapted to such high pulse exposures. Adult and larger juvenile salmonids appear to be little affected by the high concentrations of suspended sediments that occur during storm and snowmelt runoff episodes (Bjornn and Reiser 1991). However, research indicates that chronic exposure can cause physiological stress responses that can increase maintenance energy and reduce feeding and growth (Redding et al. 1987; Lloyd 1987; Servizi and Martens 1991).

At moderate levels, turbidity has the potential to adversely affect primary and secondary productivity, and at high levels, has the potential to injure and kill adult and juvenile fish. Turbidity might also interfere with feeding (Spence et al. 1996). Newly emerged salmonid fry may be vulnerable to even moderate amounts of turbidity (Bjornn and Reiser 1991). Other behavioral effects on fish, such as gill flaring and feeding changes, have been observed in response to pulses of suspended sediment (Berg and Northcote 1985). Fine redeposited sediments also have the potential to adversely affect primary and secondary productivity (Spence et al. 1996), and to reduce incubation success (Bell 1991) and cover for juvenile salmonids (Bjornn and Reiser 1991). Larger juvenile and adult salmon appear to be little affected by ephemeral high concentrations of suspended sediments that occur during most storms and episodes of snow melt. However, other research demonstrates that feeding and territorial behavior can be disrupted by short-term exposure to turbid water.

It is unlikely that suspended sediment will settle out directly at the cofferdam construction site due to high water velocity in the channel near the canal intake. However, suspended sediment has the potential to settle out on top of the existing bed material further downstream, possibly affecting the quality of spawning and rearing habitat. Fine suspended sediment typically settles out in areas of lowest velocity, such as pockets, backwaters, and pools. Since chinook salmon spawn in water with velocities between 30 and 91 cm/second (Bjornn and Reiser 1991), it is unlikely that spawning areas will experience any significant sedimentation. In addition, spawning ground flights conducted by EWEB and ODFW indicate that there are no chinook spawning redds in the north channel downstream of the intake (EWEB 2002). In the 3.9-mile reach downstream of the Walterville Intake to Hendricks Bridge, only 9, 5, and 3 chinook redds were counted in 2001, 2000, and 1999, respectively (EWEB 2002). However, because these surveys were done from the air, redds in side channels and near the stream banks were obscured from view by riparian vegetation, so additional redds may exist in this area (NMFS 2001). Combined with EWEB's Proposed Measures that will reduce the likelihood that suspended sediment will enter the river from the construction area, the likelihood of suspended sediment affecting spawning habitat is small.

Operation of construction machinery in, and in close proximity to, the river introduces a chance for toxic contaminants to enter the river. Pollutants can be introduced into waterbodies through direct contact with contaminated surfaces or by the introduction of storm or washwater runoff and can remain in solution in the water column or deposit on the existing bed material. Research has shown that exposure to contaminants reduces reproductive capacity, growth rates, and resistance to disease, and may lead to lower survival for salmon (Arkoosh 1998 a & b).

EWEB's Proposed Measures include numerous measures for reducing the likelihood that suspended sediment or pollutants will enter the river. Implementation of a PECP is included as EWEB's Proposed Measure (a.)(iv.). FERC license article 401 required that EWEB submit a PECP, including a Spill Containment and Control Plan, prior to construction. The PECP was submitted to FERC on April 2, 2002, and received NMFS' approval by letter dated March 22,

2002. The PECP contains all of EWEB's Proposed Measures that were submitted as part of the proposed action for this consultation. Specific measures for reducing the impacts of turbidity and pollutants are included in the following Proposed Measures: (a.)(vi.) Treated Wood Removal, (b.) Pre-construction Activities, (c.) Heavy Equipment, and (d.) Site Preparation. The likelihood that contaminants will enter waterways will be minimized by implementation and enforcement of the PECP.

In summary, there is some risk of injury and mortality associated with turbidity and chemical pollutants from construction of the cofferdam. However, these impacts should not significantly affect long-term habitat processes or population levels, because the turbidity should be localized, brief, and timed to occur within a period that minimizes effects on UWR chinook salmon. In addition, neither the turbidity nor pollutant levels that could be expected from this project are likely to impair currently properly functioning habitat or retard the long-term progress of impaired habitats towards recovery.

#### 6.1.1.2 Barb-breakwater and Boat Ramp Construction; Canal Tip and North Bank Armoring

Construction of the barb-breakwater, new boat ramp, and armoring canal intake tip and north bank will involve removal of existing cribbing, localized excavation along the river margin and adjacent upslope areas, removal of trees, and placement of rock along the banks of the canal intake. Recontouring and armoring of the north bank and a portion of the barb-breakwater structure will be completed entirely within the dewatered area behind the primary cofferdam, and most of the boat ramp construction will occur behind a small secondary cofferdam. However, installation of a portion of the barb-breakwater and boat ramp will occur in the wet behind the silt curtain, introducing some risk for direct mechanical injury to fish trapped behind the silt curtain. If water behind the silt curtain is turbid immediately prior to removal of the silt curtain, the turbid water will be pumped and filtered prior to discharge into the river in accordance with EWEB's Proposed Measure (a.)(vi.). However, disruption of the bed material is necessary for the removal of the silt curtains and will temporarily increase turbidity near the canal intake. Water that seeps or flows into the dewatered area behind the cofferdam will be pumped out of the area and filtered prior to discharge into the river or canal in accordance with EWEB's Proposed Measures and the PECP. EWEB will remove and dispose of existing creosote timber cribbing and pilings from the existing canal intake according to EWEB's Proposed Measures (a.)(vi.)

Construction of the barb-breakwater, canal intake tip, and the boat ramp will involve permanent removal of approximately 500 linear feet of riparian vegetation and replacement with a vegetated rock-faced geogrid or riprap. Vegetation near the existing boat ramp currently consists primarily of Himalayan blackberry (*Rubus discolor*), an invasive, non-native species. Some small Douglas fir (*Pseudotsuga menziesii*) are present above the ordinary high-water mark. Any trees greater than 3 inches in diameter removed during construction will be mitigated for on-site by a 2:1 replanting ratio in accordance with EWEB's Proposed Measure (d.). Recontouring and armoring

of the canal intake tip will also involve removal of riparian vegetation, primarily reed canary grass (*Phalaris arundinacea*), Himalayan blackberry, and some black cottonwood (*Populus trichocarpa*).

EWEB will replace 350 feet of the north bank at the canal intake with a rock-faced geogrid. The rock-faced geogrid consists of alternating layers of soil with willow plantings and rock from the top of the bank down approximately 13 feet to the ordinary high water elevation of 607 feet. Riprap will be installed below elevation 607 feet to the canal bottom. Any instream large wood or riparian vegetation that is removed or altered during construction will remain on-site or be replaced with a functional equivalent according to EWEB's Proposed Measure (d). Any trees that are removed will be mitigated on-site by a 2:1 replanting ratio according to EWEB's Proposed Measure (d.). All other riparian areas altered during construction that do not become part of the new hardened intake structure will be recontoured and replanted with native vegetation according to EWEB's Proposed Measure (f.).

Thus, in addition to temporary increases in turbidity associated with installation and relocation of the silt curtains, the primary negative impact of construction at the canal intake is the loss of riparian vegetation. However, this loss will be mitigated on-site by replanting with native vegetation, monitoring, and replanting if needed, to ensure success.

#### 6.1.1.3 Cofferdam Removal

The primary cofferdam will be removed before August 14, 2002. Removal will occur behind the silt curtain, and any turbid water retained behind the silt curtain will be pumped and filtered before discharge to the river. However, removal of the 200-foot long silt curtain could result in minor temporary turbidity increases. The water level behind the cofferdam will be increased slowly prior to cofferdam removal to minimize the impacts of removal. Likewise, the headgates will be opened slowly to bring the new fish screens on-line in a manner that is safe and effective for fish passage.

### 6.1.2 Walterville Fish Screen, Fish Bypass, and Fish Evaluation Facility

Construction of the juvenile fish screen bypass and fish evaluation facility will involve several steps. Most of construction will occur in the dewatered canal or on the upslope areas along Partridge Lane.

#### 6.1.2.1 Installation of the New Fish Screen

A new fish screen will be constructed approximately 500 ft. downstream of the canal headgates in the dry within the dewatered canal, and the primary effects of this activity will be removal of riparian vegetation. Construction will begin after the fish salvage and canal dewatering operation is complete. Installation of the new fish screen will involve removal of riparian vegetation along

approximately 200 ft. of bank along either side of the canal to clear the area for installation of the fish screen structure. The existing bank does not contain any designated wetlands, but consists primarily of Himalayan blackberry, reed canary grass, and young Douglas fir. Any instream large wood or riparian vegetation that is removed or altered during construction will remain on-site or be replaced with a functional equivalent according to EWEB's Proposed Measure (d). Any trees larger than 3 inches in diameter removed during construction will be mitigated for on-site with a 2:1 replanting ratio in accordance with EWEB's Proposed Measure (d.)(iii.). Any vegetation cleared for temporary construction access (that is not replaced with the fish screen structure) will be replanted with native vegetation after construction according to EWEB's Proposed Measure (f.). Construction of the fish screen will be completed entirely in the dry and will not have any direct effects on UWR chinook salmon.

#### 6.1.2.2 Construction of the Fish Bypass Pipeline

Construction of the bypass pipeline will involve excavation of a trench from the fish screen down the middle of Partridge Lane to the location of the outfall. A 2,200-ft. long, 54-inch diameter pipe will be installed in the trench beneath the road. The 100-foot section of the pipeline that stretches from the fish screen to the existing access road off Partridge Lane will involve temporary removal of riparian vegetation. The remainder of the excavation and installation will occur directly beneath Partridge Lane and will have no impact on UWR chinook salmon. Erosion control measures consistent with EWEB's PECP will be in place to ensure that any rainfall-induced turbid runoff along Partridge Lane will be adequately filtered prior to entering the McKenzie River. After construction is complete, all areas cleared of vegetation will be replanted with native vegetation in accordance with EWEB's Proposed Measure (f.).

#### 6.1.2.3 Construction of the Fish Bypass Outfall and Evaluation Facility

Construction of the fish bypass outfall and evaluation facility will involve in-water work to install a silt curtain and then construct a small cofferdam. Construction of the cofferdam, installation of the outfall structure, and removal of the cofferdam will occur within the preferred in-water work window of July 1 through August 31, 2002. Fish will be removed from the dewatered area using techniques outlined in EWEB's ODFW-approved Fish Salvage Plan. Because machinery will be in the river, there is a chance for direct injury to fish. The risk of direct mechanical injury is low, as fish will likely avoid the area and utilize available habitat in other portions of the channel. Disruption of approximately 30 feet of riverbed and riverbank associated with construction and removal of the cofferdam will likely result in increased turbidity in the McKenzie River immediately downstream of the construction site. These impacts will be minimized by utilization of the silt curtain, as any turbid water trapped behind the silt curtain will be filtered prior to discharge into the McKenzie River. Operation of equipment in or close to the river also increases the likelihood of chemical contaminants entering the river, which can have negative impacts on aquatic ecosystems as described in section 6.1.1.1. Implementation of

EWEB's PECP and Proposed Measures will minimize the likelihood of negative impacts associated with increased turbidity and the possibility of chemical contaminants entering the river. Construction of the fish evaluation facility will occur in the dewatered area behind the cofferdam and should not have any impact on chinook salmon or habitat.

Riparian vegetation will be removed along a 30-foot section of the riverbank at the location where the fish bypass pipeline enters the McKenzie River. Approximately 11 trees greater than 3 inches in diameter will be removed, including a large black cottonwood (*Populus trichocarpa*), and several small Oregon ash (*Fraxinus latifolia*) and big-leaf maple (*Acer macrophyllum*). Any instream large wood or riparian vegetation that is removed or altered during construction will remain on-site or be replaced with a functional equivalent according to EWEB's Proposed Measure (d). Loss of trees will be mitigated for on-site with a 2:1 replanting ratio in accordance with EWEB's Proposed Measure (d.), and all altered areas will be replanted with native riparian vegetation in accordance with EWEB's Proposed Measure (f.).

### 6.1.3 Installation of Rock-Drop Weir Structures

Construction of the rock-drop weir structures will involve substantial in-river work which will be completed entirely within the preferred ODFW in-water work window between July 1 and August 30. Rock-drop weir structures will be constructed in the north channel between Walterville Canal and Rodman Island, and in a small channel between Rodman and Kaldor islands.

#### 6.1.3.1 Access to Rodman Island

Construction equipment will access the construction sites by crossing the north channel of the McKenzie River adjacent to Rodman Island through a shallow riffle area about 500 feet downstream of the Walterville Canal intake. Approximately 20 linear feet of riparian vegetation will be removed on both banks of the river to allow large dump trucks and equipment access to and from the north channel. Although erosion control measures (as described in EWEB's PECP and Proposed Measures) will be in effect to minimize bank erosion, some erosion of the bank will likely occur and contribute suspended sediment to the river. Additionally, bed material in the river will be dislodged when large equipment crosses the 250-foot-wide north channel, which will temporarily increase suspended sediment downstream of the crossing location. The effects of temporary increases in suspended sediment on aquatic ecosystems are described in detail in section 6.1.1.1. The levels of increased turbidity likely to be caused by this project are not expected to affect the quality of spawning or incubation habitat because the in-water work will occur prior to the spawning season, and there are very few chinook salmon redds located downstream of the Walterville Intake (as described in detail in section 6.1.1.1). Crossing the north channel will also temporarily disrupt two designated wetlands consisting primarily of Sitka willow (*Salix sitchensis*); these wetlands will be replanted with native vegetation at the conclusion of construction.

After crossing the McKenzie River's north channel to access Rodman Island, equipment will traverse the island to the construction site at the island's northeast corner using a primitive access road. Although remnants of a road exist, the contractors must remove herbaceous vegetation and riparian trees to make the road usable by large machinery. Any instream large wood or riparian vegetation that is removed during construction will remain on-site or be replaced with a functional equivalent according to EWEB's Proposed Measure (d). Any vegetation removed or disturbed to access or cross Rodman Island will be replanted with native woody and herbaceous riparian vegetation in accordance with EWEB's Proposed Measures (f.). Additionally, any trees greater than 3 inches in diameter that are removed for construction access will be mitigated for on-site with a 2:1 replanting ratio in accordance with EWEB's Proposed Measure (d.).

#### 6.1.3.2 Installation of Rock-drop Weir Structures

After accessing the construction sites, the contractor will excavate the riverbed and adjacent riverbank and install rock material to anchor the rock-drop weir structures into the bed and bank. After anchoring the structures, the contractor will install the rock-drop weir structures according to the following contract specification: "Each stone shall be individually set in place at essentially its final position using the excavator aided by its opposable thumb. At the engineer's direction, some of the stones shall be picked up and repositioned. Streambed excavation shall only be large enough to accommodate each rock and maintain surface grade." The process will require frequent crossings of the north channel and a substantial amount of in-river work that will affect chinook salmon and salmon habitat in many ways, as described below.

Fish Passage

Although the hydraulic conditions in the vicinity of the rock-drop structures should remain conducive to safe fish passage during construction, chinook salmon could be directly injured by either coming in contact with construction equipment in the river, or by the placement of large rocks. Adult chinook will be migrating upstream during the construction period and will likely utilize the north channel around Rodman Island and the small channel between Rodman and Kaldor islands as a migration corridor. The presence of wild adult chinook passing through the project area typically decreases towards late July, so delaying installation of the rock-drop structures (if possible) until after July 15 would minimize the risk of impacting migrating wild chinook salmon. In addition, juvenile salmon could be present in the project vicinity and subject to direct impacts from in-river work, particularly during low flows (pers. comm., Jeff Ziller, ODFW, Springfield, OR).

Water Quality

Excavation and installation of the rock-drop weir structures will increase the suspended sediment load in the river, which will have similar impacts on UWR chinook salmon and salmon habitat as described in detail in section 6.1.1.1. Additionally, the frequent and persistent presence of construction machinery in the river during installation of the rock drop structures greatly increases the likelihood of chemical contaminants entering the river. The contractor will use a

biodegradable, non-toxic hydraulic fluid that meets the toxicity requirements of the U.S. Environmental Protection Agency and the U.S. Fish and Wildlife Service. Implementation of EWEB's PECP will minimize the likelihood of contamination, and will assure prompt clean-up of any spills that do occur.

Riparian and Wetland Habitat

Riparian habitats are one of the most ecologically productive and diverse terrestrial environments (Kondolf et al. 1996; Naiman et al. 1993). Vegetation in wetland and riparian areas influences channel processes by stabilizing bank lines through root reinforcement, providing a source of large wood, and by retaining sediment during high-flow events. Riparian areas provide energy sources for aquatic organisms by producing organic input (e.g., leaf litter) and terrestrial organisms that fall into the water and are preyed upon by fish. Riparian vegetation provides shade that regulates light and temperature regimes (Kondolf et al. 1996; Naiman et al. 1993). In addition, riparian vegetation and large wood can provide low velocity habitat for fish during periods of flooding, while instream large wood provides similar habitat at all flow levels, as well as shelter from predators, habitat for prey species, and the sediment storage and channel stability attributes described above (Spence et al. 1996). For this project, any instream large wood or riparian vegetation that is moved or altered by construction activities will stay on-site or be replaced with a functional equivalent in accordance with EWEB's Proposed Measure (d.)(iii.). The contractor will also recontour and replant all affected areas with native woody and herbaceous vegetation after construction in accordance with EWEB's Proposed Measures (f.). Success of replanting efforts will be assured by implementation and enforcement of EWEB's Proposed Measure (f.)(ix.) regarding planting success.

A total of 0.11 acres of wetlands will be replaced with large boulder material for construction of the rock-drop weir structures. A small island wetland consisting of Sitka willow will be repeatedly crossed by construction equipment to access Rodman Island. Additionally, a portion of this wetland (approximately 0.03 acres) will be permanently covered by the placement of a rock-drop weir structure. Approximately 0.03 acres of another wetland on the north bank of the McKenzie River will also be replaced by a rock-drop weir structure. Installation of the rock-drop weir structure between Rodman and Kaldor islands will fill in approximately 0.05 acres of Sitka willow-dominated wetland at the northeastern tip of Rodman Island. These wetland losses will be mitigated for with a 3:1 replanting ratio of additional Sitka willow on appropriate open cobble bars. Other riparian areas that are not designated wetland will also be permanently destroyed by the placement of the rock-drop weir structures. Any trees greater than 3 inches in diameter that are removed will be mitigated for on-site with a 2:1 replanting ratio in accordance with EWEB's Proposed Measure (d). Any riparian areas that are temporarily altered during construction will be revegetated with native woody and herbaceous vegetation in accordance with EWEB's Proposed Measure (f.).

### 6.1.4 Walterville Tailrace Excavation

Construction in the Walterville Tailrace immediately below the powerhouse will involve construction of a temporary access road down the bank to the tailrace. The tailrace will be deepened by an average of 18 inches for approximately 500 feet immediately downstream of the powerhouse and above the Camp Creek Bridge. Excavation of the tailrace will occur after the canal has been dewatered so there is no risk of direct impact to chinook salmon from this activity. However, riparian vegetation along the canal banks will be altered during construction of the temporary access road to the canal, and two small trees greater than 3 inches in diameter will be removed Both canal banks are sparsely vegetated with young Douglas fir and big-leaf maple. The south bank has an understory of sword fern (*Polystichum munitum*) and the north bank is vegetated with Himalayan blackberry. Any trees greater than 3 inches in diameter that are removed during construction will be mitigated for on-site with a 2:1 replanting ratio in accordance with EWEB's Proposed Measure (d). Any riparian areas that are temporarily altered during construction will be revegetated with native woody and herbaceous vegetation in accordance with EWEB's Proposed Measure (f.).

### 6.1.5 Walterville Tailrace Barrier Installation

Installation of the new tailrace barrier involves construction of a cofferdam across the adult bypass channel, installation of a settling basin at the downstream end of the tailrace, removal of the existing fish barrier, installation of the new tailrace barrier, and installation of gabions along the tailrace banks upstream from the new barrier. Installation of the new tailrace barrier will begin in June 2002, and be completed by October 2002, in accordance with the required construction schedule.

#### 6.1.5.1 Construction of a Cofferdam in Adult Bypass Channel

To dewater the tailrace barrier construction site, a cofferdam will be constructed across the upstream end of the existing adult bypass channel. The cofferdam will be constructed by forming a plug of existing riprap and gravel material from the adjacent wingwall at the upstream end of the bypass channel. Construction of the cofferdam and fish salvage behind the cofferdam could result in direct mechanical injury to fish in the project area. However, this risk is small since fish are likely to avoid in-river machinery and utilize other parts of the McKenzie River. After installation of the cofferdam, any fish trapped in the tailrace downstream of the bypass channel will be rescued using techniques described in the ODFW-approved Fish Salvage Plan. There will likely be a temporary increase in suspended sediment in the McKenzie River during cofferdam construction, although the majority of the turbid water will flow downstream through the bypass channel before reentering the McKenzie River, so some of the suspended sediment will settle out prior to entering the McKenzie River.

### 6.1.5.2 Construction of a Temporary Settling Basin

After the tailrace has been dewatered, a 45-foot by 45-foot temporary settling basin will be constructed downstream of the new tailrace barrier construction site to capture any runoff in the tailrace from tributary input or from groundwater seepage. The settling basin will be designed with a 2-foot minimum settling depth, with a straw-bale fence immediately downstream to provide additional filtering of effluent water from the settling basin. Water will not be discharged downstream into the McKenzie River unless it has been thoroughly filtered. If the settling basin and straw-bale filter do not appear to adequately filter seepage water, then the contractor will take additional measures (e.g., pump-and-treat) to ensure sufficient filtration. Sediment trapped within the sedimentation basin during construction will be removed prior to rewatering the canal and tailrace.

### 6.1.5.3 Construction of a New Tailrace Velocity Barrier

The existing fish barrier will be removed prior to installation of the new tailrace barrier. Removal of the existing barrier will occur after the canal and tailrace have been completely dewatered in accordance with the ODFW-approved Fish Salvage Plan. Thus, removal of the existing barrier and construction of the new tailrace barrier will occur in the dry, with very little chance for direct impact to UWR chinook salmon. Portions of the tailrace bank will be widened to install the new tailrace velocity barrier, and the entrance to the adult bypass channel will be widened and hardened with riprap. The new concrete tailrace velocity barrier will be installed across the entire tailrace, and riprap fill will be installed immediately downstream of the barrier. Although construction of the barrier will occur in the dry, seepage water in the canal will likely become sediment-laden during construction. Seepage water in the tailrace will be filtered with a temporary sedimentation basin downstream of the construction site as described in section 6.1.5.2. Although the sedimentation basin will minimize the risk of turbid water entering the river, there is still a chance for chemical contaminants from construction equipment to enter the McKenzie River. Implementation of the PECP and EWEB's Proposed Measures will reduce the risk of chemical spills and minimize the impacts of any spills that do occur.

Numerous trees will be removed during installation of the new structure, and 0.03 acres of designated wetland at the entrance to the bypass channel will be permanently filled with riprap. Mitigation for the wetland loss includes restoration and replanting of the bank along the upper portions of adult bypass channel, as outlined in the Compensatory Mitigation Plan (Environmental Solutions LLC 2002b). Additionally, all trees removed during construction will be replanted at a 2:1 ratio in accordance with EWEB's Proposed Measure (d.), and any areas where vegetation is temporarily disturbed will be replanted with native vegetation in accordance with EWEB's Proposed Measure (f.).

#### 6.1.5.4 Installation of Gabions on Tailrace Banks

The new tailrace velocity barrier will impound water at a higher elevation than the existing barrier, and the tailrace banks above the barrier must be raised to accommodate the higher water level. Gabion walls will be installed for approximately 900 feet upstream of the barrier on the north bank and for approximately 600 feet on the south bank. Installation of the gabions will occur in the dry after the canal has been dewatered, so there is no chance of direct mechanical injury to UWR chinook during construction. However, installation of the gabions involves removal of 1,500 linear feet of riparian vegetation along the banks of the tailrace. Existing vegetation along the tailrace banks includes red alder (*Alnus rubra*), black cottonwood, and big-leaf maple with slough sedge (*Carex obnupta*) and snowberry (*Symphoricarpos albus*) understory. Approximately 55 trees greater than 3 inches in diameter will be removed during installation of the gabions. Removal of these trees will be mitigated for on-site with a 2:1 replanting ratio in accordance with EWEB's Proposed Measure (d.). In addition, any areas that are altered during gabion installation (including the bank behind the gabions) will be replanted with native woody and herbaceous vegetation in accordance with EWEB's Proposed Measures (f.). Any instream large wood or riparian vegetation that is removed or altered during construction will remain on-site or be replaced with a functional equivalent according to EWEB's Proposed Measure (d). Although UWR chinook salmon will not enter the canal and tailrace after completion of the project, the water in the canal and tailrace returns to the McKenzie River and will remain a component of the ecosystem. The canal and its riparian area will still provide a source of allochthonous material, habitat for terrestrial invertebrates, and water quality enhancement (e.g., cooling of water temperature with adequate riparian cover). The functions of riparian and wetland vegetation are described in detail in section 6.1.3.2.

### 6.2 Passage Conditions During Construction

Adequate upstream will be provided through the Leaburg-Walterville Project throughout construction. Spring chinook salmon begin entering the McKenzie system as early as mid-April, and typically pass through the project area beginning in late April. The migration continues for several months and spawning begins as early as August. Currently, the right bank ladder at Leaburg Dam is under construction and the left bank ladder is operating. Thus, migrating chinook salmon during the 2002 migration season will pass upstream using the left bank ladder until completion of the new right bank ladder in November. Construction at the Walterville canal intake and tailrace barrier will occur in the dry and will not affect adult migration. The rock-drop weir structures will be installed in a manner that enables passage through the project areas in the north channel and the small channel between Rodman and Kaldor islands. The south channel of the McKenzie River will remain completely unobstructed throughout the migration season and can be utilized by migrating adult UWR chinook salmon as well.

Downstream-migrating fry pass through the project primarily between January and April, while the fingerling migration occurs primarily during October and November. During construction of

the Walterville fish screen and tailrace barrier, the canal intake will be closed off with a cofferdam, so juvenile fish will be excluded from the canal and will pass downstream in the McKenzie River. Thus, both downstream-migrating juveniles and adult upstream migrants will be afforded safe downstream passage throughout the entire construction process.

## 6.3 Effects on Critical Habitat

Critical habitat for UWR chinook salmon was designated on February 16, 2000 (65 FR 7764). Within the McKenzie subbasin, critical habitat includes all accessible areas except those above Tamolitch Falls and Blue River Dam. The effects of the proposed action on the essential features of designated critical habitat are summarized below.

The 10 essential features of UWR chinook salmon critical habitat are 1) substrate, 2) water quality, 3) water quantity, 4) water temperature, 5) water velocity, 6) cover/shelter, 7) food, 8) riparian vegetation, 9) space, and 10) safe passage conditions. The construction activities at the Walterville Project are likely to have temporary adverse effects on several aspects of critical habitat. However, it is expected that due to implementation of EWEB's Proposed Measures and the ODFW-approved construction schedule, the negative effects will be brief in nature and are not expected to impair currently properly-functioning habitat or appreciably reduce the functioning of already impaired habitats. The underlying ecological design approach to construction and resulting beneficial passage improvements will contribute to natural habitat-forming processes and ultimately improve conditions for adult and juvenile UWR chinook salmon in the project area.

Table 6-1. Summary of effects of the proposed action on essential features of UWR chinook salmon critical habitat.

| *UWR Essential Habitat Feature* | *Summary of Effects* |
|---|---|
| Substrate | No long-term adverse effects on biological requirements for spawning gravel (size or distribution) are expected under the proposed action. |
| Water quality | Although short-term impacts to water quality (increased suspended sediment) are expected, the proposed action does not include measures that would be likely to adversely affect water quality. |
| Water quantity | The proposed action does not include measures that will adversely affect biological requirements for water quantity. |
| Water velocity | The proposed action does not include measures that will adversely affect biological requirements for water velocity. |
| Cover/shelter | The proposed action does not include measures that will adversely affect biological requirements for cover or shelter. |
| Food | Although short-term increases in suspended sediment might interfere with primary production and feeding behavior, the proposed action does not include measures that are likely to adversely affect long-term biological requirements for food. |
| Riparian vegetation | Although riparian vegetation will be removed during construction, most will be replanted. Any vegetation that is permanently removed and replaced with infrastructure will be mitigated for on-site with a 2:1 replanting ratio. Thus, the proposed action does not include measures that will adversely affect long-term riparian vegetation function. |
| Space | The proposed action does not include measures that will adversely affect biological requirements for space. |
| Safe passage conditions | The proposed action does not include measures that will adversely affect safe passage conditions. |

## 6.4 Effects of Interrelated and Interdependent Activities

Effects of the proposed action include the effects of other activities that are interrelated to, or interdependent with, that action. Interrelated and interdependent activities are those that would not be undertaken by the action agency but for the proposed action. NMFS is not aware of any interrelated and interdependent activities associated with the proposed action.

# 7. CUMULATIVE EFFECTS

Cumulative effects, as defined in 50 CFR §402.02, include the effects of future state, tribal, local, or private actions, not involving Federal activities, that are reasonably certain to occur within the action area (described in Section 1). Future Federal actions requiring separate consultations pursuant to Section 7 of the ESA are not considered here.

State, tribal, and local government actions are likely to be in the form of legislation, administrative rules, or policy initiatives. Government and private actions may include changes in land and water use patterns, including ownership and intensity, any of which could affect listed species or their habitat. Even actions that are already authorized are subject to political, legislative, and fiscal uncertainties. These realities, added to the geographic scope of the action area, which encompasses numerous government entities exercising various authorities and many private landholdings, make any analysis of cumulative effects difficult and even speculative. This section identifies representative actions that, based on currently available information, are reasonably certain to occur. NMFS also identifies goals, objectives and proposed plans by state and Tribal governments. However, NMFS is unable to determine at this point in time whether such proposals will in fact result in specific actions.

## 7.1 State Actions

Most future actions by the state of Oregon are described in the Oregon Plan for Salmon and Watershed measures, which includes the following programs designed to benefit salmon and watershed health:

- Oregon Department of Agriculture water quality management plans
- Oregon Department of Environmental Quality development of total maximum daily loads (TMDLs) in targeted basins; implementation of water quality standards
- Oregon Watershed Enhancement Board funding programs for watershed enhancement programs, and land and water acquisitions
- ODFW and Oregon Water Resources Department (OWRD) programs to enhance flow restoration
- OWRD programs to diminish overappropriation of water sources
- ODFW and Oregon Department of Transportation programs to improve fish passage; culvert improvements/replacements
- Oregon Department of Forestry state forest habitat improvement policies and the Board of Forestry pending rules addressing forestry effects on water quality and riparian areas
- Oregon Division of State Lands and Oregon Parks Department programs to improve habitat health on state-owned lands
- Department of Geology and Mineral Industries program to reduce sediment runoff from mine sites

- State agencies funding local and private habitat initiatives; technical assistance for establishing riparian corridors; and TMDLs

If the foregoing programs are implemented, they may improve habitat features considered important for the listed species. In November 2000, however, Oregon voters approved a broad constitutional amendment requiring payment to private property owners for diminution in property values resulting from regulations. That measure essentially puts all Oregon regulatory initiatives into question. The Oregon Plan also identifies private and public cooperative programs for improving the environment for listed species. The success and effects of such programs will depend on the continued interest and cooperation of the parties. One such cooperative program, the Willamette Restoration Initiative (WRI), has been charged with developing the Willamette basin section of the Oregon Plan. The future of the WRI will be subject to discussion among the WRI board, the Oregon Governor's office, and the Oregon legislature in the 2001 legislative session.

In the past, Oregon's economy has depended on natural resources, with intense resource extraction. Changes in the state's economy have occurred in the last decade and are likely to continue, with less large-scale resource extraction, more targeted extraction, and significant growth in other economic sectors. Growth in new businesses, primarily in the technology sector, is creating urbanization pressures and increased demands for buildable land, electricity, water supplies, waste-disposal sites, and other infrastructure.

Economic diversification has contributed to population growth and movement in the Willamette Valley, a trend likely to continue for the next few decades. Such population trends will result in greater overall and localized demands for electricity, water, and buildable land in the action area; will affect water quality directly and indirectly; and will increase the need for transportation, communication, and other infrastructure. The impacts associated with these economic and population demands will probably affect habitat features such as water quality and quantity, which are important to the survival and recovery of the listed species. The overall effect will be negative, unless carefully planned for and mitigated.

Some of the state programs described above are designed to address these impacts. Oregon also has a statewide, land-use-planning program that sets goals for growth management and natural resource protection. If the programs continue, they may help lessen the potential for the adverse effects discussed above.

## 7.2 Local Actions

Local governments will be faced with similar and more direct pressures from population growth and movement. There will be demands for intensified development in rural areas, as well as increased demands for water, municipal infrastructure, and other resources. The reaction of local governments to growth and population pressure is difficult to assess without certainty in policy

and funding. In the past, local governments in Oregon generally accommodated growth in ways that adversely affected listed fish habitat. Because there is little consistency among local governments regarding current ways of dealing with land use and environmental issues, both positive and negative effects on listed species and their habitat are probably scattered throughout the action area.

Local governments in Oregon are considering ordinances to address effects on aquatic and fish habitat from different land uses. The programs are part of state planning structures; however, local governments are likely to be cautious about implementing new programs, because of the passage of the constitutional amendment discussed above. Some local government programs, if submitted, may qualify for a limit under NMFS' 4(d) rule, which is designed to conserve listed species. Local governments may also participate in regional watershed health programs, although political will and funding will determine participation and, therefore, the effect of such actions on listed species. Overall, unless beneficial programs are comprehensive, cohesive, and sustained in their application, it is not likely that local actions will have measurable positive effects on listed species and their habitat and may even contribute to further degradation.

## 7.3 Tribal Actions

Tribal governments will participate in cooperative efforts involving watershed and basin planning designed to improve aquatic and fish habitat. The results of changes in tribal forest and agricultural practices, in water resource allocation, and in land use are difficult to assess, for the reasons discussed in sections 7.1 and 7.2. The earlier discussion of the effects of economic diversification and growth applies also to tribal government actions. The tribal governments have to apply and sustain comprehensive and beneficial natural resource programs such as the ones described below, to areas under their jurisdiction to have measurable positive effects on listed species and their habitat.

NMFS knows of no ongoing tribal fisheries restoration project in the McKenzie River basin.

## 7.4 Private Actions

The effects of private actions are the most uncertain. Private landowners may convert their lands from current uses, or they may intensify or diminish those uses. Individual landowners may voluntarily initiate actions to improve environmental conditions, or they may abandon or resist any improvement efforts. Their actions may be compelled by new laws, or they may result from growth and economic pressures. Changes in ownership patterns will have unknown impacts. Whether any of these private actions will occur is highly unpredictable, and the effects are even more so.

## 7.5 Summary

Non-Federal actions are likely to continue affecting listed species. The cumulative effects in the action area are difficult to analyze, considering the broad geographic landscape covered by this opinion, the geographic and political variation in the action area, the uncertainties associated with government and private actions, and ongoing changes to the region's economy. Whether those effects will increase or decrease in the future is a matter of speculation; however, based on the population and growth trends identified in this section, cumulative effects are likely to increase. Although state, tribal, and local governments have developed plans and initiatives to benefit listed fish, they must be applied and sustained in a comprehensive manner before NMFS can consider them "reasonably foreseeable" in the analysis of cumulative effects.

# 8. CONCLUSIONS

In this opinion, NMFS must determine whether the action is likely to jeopardize UWR chinook salmon, as well as whether the action is likely to destroy or adversely modify the species' designated critical habitat. As noted in Chapter 1, the analyses of jeopardy/destruction or adverse modification of critical habitat leading to these conclusions involves the following steps: 1) define the biological requirements and current range-wide status of the listed species (Chapter 4); 2) describe the status of the environmental baseline within the action area (Chapter 5); 3) evaluate the effects of the proposed action on the listed species (Chapter 6); and 4) consider the cumulative effects on the listed species (Chapter 7).

This opinion concludes that the effects of the proposed action, together with the environmental baseline and cumulative effects, is not likely to jeopardize the continued existence of UWR chinook salmon or result in the destruction or adverse modification of its designated critical habitat. Although the available information includes quantitative estimates of the risk of extinction under the environmental baseline, it is largely qualitative, based on the best available scientific and commercial data. Despite an increasing trend toward a more quantitative understanding of the critical life signs for these fish, critical uncertainties limit NMFS' ability to project future conditions and effects. As a result, no hard and fast numerical indices are available on which NMFS can base determinations about jeopardy or the adverse modification of critical habitat (i.e., the Section 7(a)(2) standards). Therefore, NMFS' conclusions are qualitative judgements based on the best quantitative and qualitative information available.

As discussed in Section 4.1.1 in NMFS (2002), historically, five major subbasins in the upper Willamette system produced spring chinook salmon: the Clackamas, North and South Santiam, Middle Fork Willamette, and McKenzie rivers. Between 1952 and 1968, dams were built on all of the major tributaries occupied by spring chinook salmon, blocking over half of the most productive spawning and rearing habitat. Water management operations have reduced the quality of the remaining spawning and rearing habitat in downstream areas. In particular, the release of relatively warm water during autumn leads to the early emergence of stream-type chinook salmon fry and relatively cold water released during summer may delay adult migrants. Mitigation hatcheries, built to offset the substantial habitat losses resulting from dam construction, maintained broodlines that are relatively free of genetic influences from outside the basin but may have homogenized within-basin stocks, simplifying the population structure of the ESU. The number of naturally-spawning fish has increased gradually in recent years, but NMFS believes that many are first-generation progeny of hatchery fish.

At this time, chinook salmon in the McKenzie River above Leaburg Dam constitute the largest remaining spawning aggregation of wild fish in the UWR ESU (approximately 40% of the ESU's production potential). Within the action area, the environmental baseline continues to limit the productivity of the population in the following ways:

- Storage and release operations at the USACE's Cougar and Blue River dams have reduced the frequency and magnitude of flood events, which has created a relatively static and simplified aquatic habitat compared to conditions under which UWR chinook salmon evolved
- Storage and release operations at the USACE's Cougar and Blue River dams have altered the annual hydrograph, by reducing peak flows in the winter and spring and by increasing low flows in the summer and fall
- Construction of the USACE's Cougar and Blue River dams trapped both sediment and large woody debris in the upper subbasin, reducing transport to spawning habitat in the Leaburg and Walterville reaches
- Large wood was directly removed from stream channels of all sizes in a misdirected effort to improve fish passage, for timber salvage, to reduce downstream damage to bridges during floods, and to prevent navigation hazards
- Much of the riparian vegetation was removed for farmland, residences, timber harvest, and roads, reducing the acreage covered and functional value of the riparian zone
- Altered flow regime and the construction of flood control structures (levees and revetments) affected channel morphology: the creation of new bars and islands, bank erosion, channel width and meandering, and the migration of channel bars.

Under the terms of its reinstated FERC license, dated April 27, 2000, EWEB will greatly reduce the direct and indirect effects of its Leaburg and Walterville hydro projects as discussed in NMFS and USFWS (2001). In addition, NMFS' July 14, 2000, biological opinion on the USACE's Willamette basin hatchery mitigation program requires that all hatchery-reared spring chinook salmon be adipose-fin clipped before release, facilitating a selective fishery. NMFS estimates that implementation of the selective fishery, plus the measures at Leaburg and Walterville required by the FERC license (described in NMFS and USFWS 2001), will result in an incremental survival improvement for juvenile chinook salmon of at least 45%, within the range needed to meet NMFS' survival and recovery criteria.

By implementing the proposed action, USACE will be ensuring that EWEB takes all available measures at the Walterville Project construction site to reduce the effects of factors that could limit the productivity of the ESU:

- Any in-water work will be completed within the ODFW-approved, in-water work period developed specifically for this project.
- Most in-water work areas will be isolated from the stream with a cofferdam, so the opportunities for direct harm of fish from machinery is minimized.
- Fish salvage behind cofferdams will be conducted pursuant to EWEB's Proposed Measure (a.)(2.)(b.) and utilize the techniques outlined in EWEB's ODFW-approved Fish Salvage Plan required by FERC license article 422.
- Fish salvage in the Walterville Canal was conducted pursuant to EWEB's Proposed Measure (a.)(2.)(b.) and EWEB's ODFW-approved Fish Salvage Plan required by FERC

license article 422.

- Implementation and enforcement of EWEB's Pollution and Erosion Control Plan (and erosion and sediment control practices described in EWEB's Proposed Measures) will minimize the likelihood of increased sediment loads and chemical contaminants entering the McKenzie River.
- All stream banks and riparian vegetation that were disrupted during construction will be successfully replanted with native woody and herbaceous riparian vegetation, ensuring the restoration of proper riparian and floodplain processes.

In recognition of the risk posed by in-river work, the proposed action includes an environmental compliance oversight and enforcement component to ensure the PECP is implemented effectively .

The only known mortality associated with this project, to date, occurred during the fish salvage operation in the Walterville Canal, resulting in an estimated 670 wild chinook fry. Additional mortality of 45 juvenile chinook salmon is expected during the salvage operations during dewatering behind several cofferdams. NMFS believes that the total estimated direct mortality of 715 juvenile chinook salmon resulting from the various salvage operations, combined with the indirect effects of construction described in Chapter 6, is not likely to jeopardize the continued existence of UWR chinook salmon.

Until a species-specific recovery plan is developed, the Basinwide Strategy (see Section 1.3) provides NMFS with guidance for judging the significance of FERC's proposed action relative to the species-level biological requirements of UWR chinook salmon. By issuing the 404 permit for the modifications at the Walterville Project, requiring EWEB to implement the measures described in the proposed action (Chapter 3 of this biological opinion), USACE will meet its responsibilities with respect to construction at the Walterville Project under the Basinwide Strategy. NMFS has determined that the proposed action will avoid jeopardy by maintaining a population trajectory within the range needed for survival and recovery. Further, NMFS finds that the proposed action will not adversely modify or destroy designated critical habitat for UWR chinook salmon.

This consultation addresses a construction project that could affect the survival of UWR chinook salmon migrating to and from the remaining spawning and rearing habitat in the McKenzie River subbasin. Much of the historical spawning habitat in this important subbasin is currently blocked by other projects – EWEB's Carmen-Smith and the USACE's Cougar and Blue River dams. Subsequent consultations with FERC and with the USACE will address the need for access to this spawning habitat to achieve the distribution and diversity this ESU requires to survive and recover.

# 9. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to Section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by regulation to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by regulation as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered to be prohibited taking under the ESA, provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

An incidental take statement specifies the amount or extent of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

The measures described below are non-discretionary, and must be undertaken by USACE and EWEB and made binding conditions of any license, contract, or permit issued in the course of implementation of any component of the proposed action for the exemption in Section 7(o)(2) to apply. The USACE has a continuing duty to regulate the activity covered by this incidental take statement. If the USACE: 1) fails to assume and implement the terms and conditions; or 2) fails to require EWEB to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permits, the protective coverage of Section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the USACE must report the progress of the action and its impact on the species to the Services as specified in the incidental take statement (50 CFR §402.14(i)(3)).

## 9.1 Amount or Extent of Take

NMFS anticipates that the proposed action is reasonably certain to result in incidental take of UWR chinook salmon because of the detrimental effects from the capture and release of fish necessary to isolate the in-water work area (non-lethal and lethal), increased sediment and possible pollutant levels (non-lethal), and riparian habitat disruption (non-lethal).

Effects of actions such as minor sedimentation and minor riparian disturbance are unquantifiable in the short term and are not expected to be measurable as long-term harm to habitat features or

as long-term harm to salmonid behavior or population levels. Therefore, even though NMFS expects some low level of incidental take to occur due to the construction actions (other than during the dewatering process), the best available scientific and commercial data are not sufficient to enable NMFS to estimate the specific amount of incidental take to the species itself. In instances such as these, NMFS designates the expected level of take due to sedimentation as "unquantifiable."

The fish salvage operation within the Walterville Canal resulted in lethal take of approximately 670 age 0+ wild chinook salmon fry. EWEB expects lethal take of approximately 30 juveniles from dewatering activities in the adult fish bypass canal, approximately 10 juveniles from dewatering activities behind the Walterville canal intake cofferdam, and approximately 5 juveniles from dewatering activities behind the small cofferdam at the bypass outfall. EWEB expects most of these fish to be age 0+ rearing juveniles. No adult chinook salmon were affected by the canal salvage operation, and no adults are expected to be encountered during cofferdam dewatering fish salvage. At all dewatering sites, EWEB will implement the handling procedures outlined in EWEB's Proposed Measure (a.)(2.)(b.) and the ODFW- approved Fish Salvage Plan required by FERC article 403.

Thus, the total lethal take expected to occur as a result of dewatering at this project is approximately 715 juvenile chinook salmon, the majority resulting from the extensive fish salvage operation required to dewater the Walterville Canal. Determining the impact of this mortality on the McKenzie subbasin population of UWR chinook salmon would require an accurate estimate of the number of fry found rearing in the McKenzie River in May, and an estimate of the percentage of fry in the McKenzie subbasin that survive to outmigrate as smolts. The fact that UWR chinook salmon migrate out of tributaries such as the McKenzie River at multiple times of the year at various life stages makes it extremely difficult to accurately determine the percentage of age 0+ juveniles that were harmed in the fish salvage operation.

The extent of take permitted by this Section 9 permit is limited to UWR chinook salmon in the McKenzie River.

## 9.2 Reasonable and Prudent Measures

NMFS believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of UWR chinook salmon from the actions covered in this opinion. The USACE shall include permit provisions to ensure that EWEB shall:

1. Minimize the likelihood of incidental take from in-river work by operating within the ODFW-approved, in-water work periods developed specifically for this project and ensuring safe passage conditions during construction.

2. Minimize the likelihood of take from fish salvage during dewatering by implementing practices outlined in the approved fish salvage plan required by FERC license article 422, which includes NMFS guidelines to avoid or minimize fish injury and mortality.

3. Minimize the likelihood of incidental take and alteration of critical habitat by ensuring that construction practices are designed to limit the affected area to the minimum necessary to complete the project, by implementing responsible construction techniques, and by fully revegetating with native species.

4. Minimize the likelihood of incidental take from sedimentation and chemical contamination by ensuring that effective erosion and pollution control measures are developed and implemented.

5. Implement a comprehensive monitoring and reporting program to ensure these conservation measures are effective in minimizing the likelihood of take from permitted activities and that the proposed mitigation actions are performing adequately.

## 9.3 Terms and Conditions

To be exempt from the provisions of Section 9 of the ESA, the USACE must include permit requirements that require EWEB to comply with the following terms and conditions, which implement the reasonable and prudent measures described above for each category of construction activity.

1. *To implement Reasonable and Prudent Measure #1 (in-river work), the USACE shall ensure the following:*

   a. In-water work. Wherever possible, work within the active channel of all anadromous fish-bearing streams, or in systems which could potentially contribute sediment or toxicants to downstream fish-bearing systems, will be completed within the ODFW approved in-water work period.[11] Due to the length of time necessary to complete some of the facilities, some in-water construction will occur outside the in-water work guidelines, based on the schedule in Appendix A that was developed in consultation with ODFW specifically for construction at the Leaburg and Walterville projects, and which was approved previously by NMFS, USFWS, and FERC.

      i. Work period extensions. If EWEB needs to extend the in-water work period from those identified in Appendix A, including those for work outside the wetted perimeter of the stream but below the ordinary high-water mark, the extensions must be approved by biologists from the Services.

[11] Oregon Department of Fish and Wildlife, *Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources*, 12 pp (June 2000)(identifying work periods with the least impact on fish) (http://www.dfw.state.or.us/ODFWhtml/InfoCntrHbt/0600_inwtrguide.pdf).

b. Isolation of in-water work area. During in-water work, if listed fish may be present, including incubating eggs or juveniles, and the project involves either significant channel disturbance or use of equipment instream, EWEB will ensure that the work area is well isolated from the active flowing stream within a cofferdam (made out of sandbags, sheet pilings, inflatable bags, gravel berm, etc.), or similar structure, to minimize the potential for sediment entrainment. The exceptions are the upper and lower diversions (rock-drop weir structures), which need to be placed in flowing water to ensure proper elevation to divert flows to the Walterville canal, ensure proper elevations to set the 1-foot drop in water elevation between the rock weirs, and to ensure that enough small rock, i.e., gravel and fines, are present in the boulders so water does not pass through the weirs, trapping fish. Furthermore, no ground or substrate disturbing action will occur within the active channel 300 feet upstream of potential spawning habitat as measured at the thalweg without isolation of the work area from flowing waters.

c. Fish screen. Any water intake structure authorized under an opinion issued by the Services must have a fish screen installed, operated, and maintained in accordance to NMFS' fish screen criteria.[12]

d. Fish passage. Work will not inhibit passage of any adult or juvenile salmonid species throughout the construction period or after project completion. All culvert and road designs will comply with ODFW guidelines and criteria for stream-road crossings[13] with appropriate grade controls to prevent culvert failure due to changes in stream elevation. EWEB's construction activities will not modify channels that could adversely affect fish passage, such as by increasing water velocities.

*2. To implement Reasonable and Prudent Measure #2 (fish rescue and salvage), the USACE shall ensure that:*

a. Seine and release. Prior to and intermittently during pumping, EWEB will attempt to seine and release fish from the work isolation area as is prudent to minimize risk of injury. Fish salvage operations shall be consistent with the approaches and techniques required by EWEB's Fish Salvage Plan (License article 422) that has been approved by ODFW for use in the Walterville Canal dewatering effort. These approaches and techniques include the following general measures.

   i. Seining will be conducted by or under the supervision of EWEB's fishery

[12] National Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria for Pump Intakes* (May 9, 1996) (guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

[13] Appendix A, Oregon Department of Fish and Wildlife Guidelines and Criteria for Stream-Road Crossings, in: G.E. Robison, A. Mirati, and M. Allen, *Oregon Road/Stream Crossing Restoration Guide: Spring 1999* (rules, regulations and guidelines for fish passage through road/stream crossings under the Oregon Plan) (http://www.nwr.noaa.gov/1salmon/salmesa/4ddocs/orfishps.htm).

biologist and all staff working with the seining operation will have the necessary knowledge, skills, and abilities to ensure the safe handling of all ESA-listed fish.

ii. ESA-listed fish will be handled with extreme care and kept in water to the maximum extent possible during seining and transfer procedures. Any transfer of ESA-listed fish will be conducted using a sanctuary net that holds water during transfer, whenever necessary to prevent the added stress of an out-of-water transfer.

iii. Seined fish will be released as near as possible to capture sites.

iv. If EWEB transfers any ESA-listed fish to third-parties other than the Services personnel, EWEB will secure written approval from the Services.

v. EWEB will obtain any other Federal, state, and local permits and authorizations necessary for the conduct of the seining activities.

vi. EWEB will allow the Services or their designated representatives to accompany field personnel during the seining activity, and allow such representative to inspect EWEB's seining records and facilities.

vii. A description of any seine and release effort will be included in a post-project report, as described below under measure g. ii.

*3. To implement Reasonable and Prudent Measure #3 (responsible construction techniques), the USACE shall ensure the following:*

a. Project design. EWEB will avoid, minimize, and mitigate impacts to natural resources from construction activities. Overall project design conditions (b.) - (i.) will be met.

b. Minimum area. Construction impacts will be confined to the minimum area necessary to complete the work project.

c. Pre-construction activities. EWEB will undertake the following actions prior to significant alteration of the action area.

i. Boundaries of the clearing limits associated with site access and construction will be flagged to prevent ground disturbance of critical riparian vegetation, wetlands and other sensitive sites beyond the flagged boundary.

ii. The following erosion control materials will be on-site.

(1) A supply of erosion control materials (e.g., silt fence and straw bales) will be on hand to respond to sediment emergencies. Sterile straw or hay bales will be used when available to prevent introduction of weeds.

(2) An oil absorbing, floating boom will be available on-site during all phases of construction whenever surface water is present.

iii. All temporary erosion controls (e.g., straw bales, silt fences) will be in-place and appropriately installed downslope of project activities within the riparian area. Effective erosion control measures will be in-place at all times during the contract,

and will remain and be maintained until such time that permanent erosion control measures are effective.

d. Site preparation. EWEB will prepare the site preparation the following manner, including removal of stream materials, topsoil, surface vegetation, and major root systems.
   i. To the extent practicable, any instream large wood or riparian vegetation that is moved or altered during construction will stay on-site or be replaced with a functional equivalent.
   ii. EWEB will minimize clearing and grubbing within 150 feet of any stream occupied by listed salmonids during any part of the year, or within 50 feet of any stream not occupied by listed salmonids.
   iii. Tree removal will be strictly limited.
      (1) All perennial and intermittent streams: Trees (3 inches diameter at breast height or greater) will be removed from within 150 feet horizontal distance of the ordinary high-water mark only when necessary for construction of approved facilities. All trees that will be removed will be flagged.
      (2) Tree removal will be mitigated for on-site by a 2:1 replanting ratio.

   iv. Whenever the project area is to be revegetated or restored, EWEB will stockpile native channel material, topsoil and native vegetation removed for the project for redistribution on the project area.

e. Cessation of work. EWEB will cease all project operations, except efforts to minimize storm or high flow erosion, under high flow conditions that may result in inundation of the project area.

f. Temporary access roads. EWEB will design temporary access roads as follows:
   i. Existing roadways or travel paths will be used whenever reasonable.
   ii. A helicopter survey conducted with ODFW during the 2001 spawning season located spawning habitat; where stream crossings are essential, EWEB will avoid any spawning habitat within 1,000 feet upstream and downstream.
   iii. No stream crossings will occur at known or suspected spawning areas or within 300 feet upstream of such areas where impacts to spawning areas may occur.
   iv. Where stream crossings are essential, EWEB's crossing design will accommodate reasonably foreseeable risks (e.g., flooding and associated bedload and debris) to prevent diversion of streamflow out of the channel and down the road in the event of crossing failure.
   v. EWEB vehicles and machinery will cross riparian areas and streams at right angles to maintain the main channel wherever reasonable.
   vi. EWEB's temporary roads within 150 feet of streams will avoid, minimize and mitigate soil disturbance and compaction by clearing vegetation to ground level and

placing clean gravel over geotextile fabric.

vii. EWEB will minimize the number of stream crossings.

g. Treated wood removal. EWEB will use the following precautions regarding removal of treated wood.
   i. No treated wood debris will fall into the water. If treated wood debris does fall into the water, it will be removed immediately.
   ii. All treated wood debris will be disposed of at an approved disposal facility for treated wood.
   iii. If treated wood pilings will be removed, EWEB will ensure these conditions are followed:
      (1) Pilings to be removed will be dislodged with a vibratory hammer, or other means acceptable to the Services.
      (2) Once loose, the pilings will be placed onto the construction barge or other appropriate dry storage location, and not left in the water or piled onto the stream bank.
      (3) If pilings break during removal, the remainder of the submerged section will be left in place.
      (4) Long-term disposal of the piles must be at an approved disposal area for hazardous materials of this classification.
      (5) Projects involving pile removal require long-term monitoring to ensure that if altered currents expose more pile, it must also be removed.

h. Heavy Equipment. EWEB will restrict use of heavy equipment as follows.
   i. When heavy equipment is required, EWEB will use equipment having the least impact (e.g., minimally sized, rubber-tired).
   ii. Heavy equipment will be fueled, maintained and stored as follows.
      (1) All equipment that is used for instream work will be cleaned prior to operations below the bankfull elevation. External oil and grease will be removed, along with dirt and mud. No wash and rinse water will be discharged into streams and rivers without adequate treatment.
      (2) Place vehicle staging, maintenance, refueling, and fuel storage areas a minimum of 50' horizontal distance from the McKenzie River for the Leaburg left bank fish ladder modification. The staging area for Leaburg right bank fish ladder reconstruction will be within 50' of the McKenzie River. The Pollution and Erosion Control Plan will prevent point-source pollution of the river.
      (3) All vehicles operated within 150 feet of any stream or water body will be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected will be repaired before the vehicle resumes operation.
      (4) When not in use, vehicles will be stored in the vehicle staging area.

i. Earthwork. EWEB will complete earthwork, including drilling, blasting, excavation, dredging, filling and compacting, in the following manner:
   i. Boulders, rock, woody materials, and other natural construction materials used for the project will be obtained from outside of the riparian area.
   ii. During excavation, native streambed materials will be stockpiled above the bankfull elevation for later use. If riprap is placed, native materials will be placed over the top of the riprap.
   iii. Material removed during excavation will only be placed in locations where it cannot enter streams or other water bodies.
   iv. All exposed or disturbed areas will be stabilized to prevent erosion.
      (1) Areas of bare soil within 150 feet of waterways, wetlands or other sensitive areas will be stabilized by native seeding,[14] mulching, and placement of erosion control blankets and mats, if applicable, quickly as reasonable after exposure, but within 7 days of exposure.
      (2) All other areas will be stabilized quickly as reasonable, but within 14 days of exposure.
      (3) Seeding outside of the growing season will not be considered adequate nor permanent stabilization.
   v. All erosion control devices will be inspected during construction to ensure that they are working adequately.
      (1) Erosion control devices will be inspected daily during the rainy season, weekly during the dry season, monthly on inactive sites.
      (2) If inspection shows that the erosion controls are ineffective, work crews will be mobilized immediately, during working and off-hours, to make repairs, install replacements, or install additional controls as necessary.
      (3) Erosion control measures will be judged ineffective when turbidity plumes are evident in waters occupied by listed salmonids during any part of the year.
   vi. If soil erosion and sediment resulting from construction activities is not effectively controlled, EWEB will limit the amount of disturbed area to that which can be adequately controlled.
   vii. Sediment will be removed from sediment controls once it has reached 1/3 of the exposed height of the control. Whenever straw bales are used, they will be staked and dug into the ground 5 inches (12 cm). Catch basins will be maintained so that no more than 6 inches (15 cm) of sediment depth accumulates within traps or sumps.
   viii. Sediment-laden water created by construction activity will be filtered before it enters a stream or other water body. Silt fences or other detention methods will be installed as close as reasonable to culvert outlets to reduce the amount of sediment entering aquatic systems.

[14] By Executive Order 13112 (February 3, 1999), Federal agencies are not authorized to permit, fund or carry out actions that are likely to cause, or promote, the introduction or spread of invasive species. Therefore, only native vegetation that is indigenous to the project vicinity, or the region of the state where the project is located, shall be used.

j. Site restoration. EWEB will restore and clean up the site, including protection of bare earth by seeding, planting, mulching, and fertilizing, in the following manner.
   i. All damaged areas will be restored to pre-work conditions including restoration of original streambank lines, and contours.
   ii. All exposed soil surfaces, including construction access roads and associated staging areas, will be stabilized at finished grade with mulch, native herbaceous seeding, and native woody vegetation prior to October 1. On cut slopes steeper than 1:2, a tackified seed mulch will be used so that the seed does not wash away before germination and rooting occurs. In steep locations, a hydro-mulch will be applied at 1.5 times the normal rate.
   iii. Disturbed areas will be planted with native vegetation specific to the project vicinity or the region of the state where the project is located, and will comprise a diverse assemblage of woody and herbaceous species.
   iv. Plantings will be arranged randomly within the revegetation area.
   v. All plantings will be completed prior to April 15.
   vi. No herbicide application will occur within 300 feet of any stream channel as part of this permitted action. Undesired vegetation and root nodes will be mechanically removed.
   vii. No surface application of fertilizer will be used within 50 feet of any stream channel.
   viii. Fencing will be installed as necessary to prevent access to revegetated sites by livestock or unauthorized persons.
   ix. Plantings will achieve an 80% survival success after three years.
      (1) If success standard has not been achieved after 3 years, EWEB will submit an alternative plan to the COE. The alternative plan will address temporal loss of function.
      (2) Plant establishment monitoring will continue and plans will be submitted to the COE until site restoration success has been achieved.

*4. To implement Reasonable and Prudent Measure #4 (pollution and erosion control), the USACE shall ensure the following:*

a. Pollution and erosion control plan. A PECP will be developed for each authorized project to prevent point-source pollution related to construction operations. For the Leaburg and Walterville construction activities, EWEB is required to develop and submit for FERC approval a PECP for construction and operation as described in license article 401. In addition to meeting the license article requirements, EWEB ensures the PECP will contain the pertinent elements listed below and meet requirements of all applicable laws and regulations:
   i. Methods that will be used to prevent erosion and sedimentation associated with access roads, stream crossings, construction sites, borrow pit operations, haul roads, equipment and material storage sites, fueling operations, and staging areas.
   ii. Methods that will be used to confine and remove and dispose of excess concrete,

cement and other mortars or bonding agents, including measures for washout facilities.

iii. A description of the hazardous products or materials that will be used, including inventory, storage, handling, and monitoring.

iv. A Spill Containment and Control Plan with notification procedures, specific clean up and disposal instructions for different products, quick response containment and clean up measures that will be available on-site, proposed methods for disposal of spilled materials, and employee training for spill containment.

v. Measures that will be taken to prevent construction debris from falling into any aquatic habitat. Any material that falls into a stream during construction operations will be removed in a manner that has a minimum impact on the streambed and water quality.

b. Wastewater filtering. Sediment-laden or contaminated water pumped from the work isolation area will be discharged into an upland area where practicable providing over-ground flow prior to returning to the canal or river. Discharge will occur in such a manner as not to cause erosion. For areas where no upland area is present, e.g., the right bank fish ladder, EWEB will assure the discharge is filtered prior to being returned to the river and filtered material is not released back to the river upon removal. EWEB will not discharge into potential fish spawning areas or areas with submerged vegetation.

c. Additional EWEB monitoring. EWEB will have two full-time inspectors in the field monitoring construction practices, including compliance with EWEB's Proposed Measures, and the PECP.[15] Implementation of the FERC-required QCIP[16] is designed to ensure environmental compliance quality control. The QCIP requires monthly progress reports regarding quality control of environmental protection measures, including the following: discussion of erosion control and other measures and their effectiveness; discussion of any instances where sediments or other construction discharges entered the stream(s); the extent of the discharges, an assessment of any damage to the stream(s); and corrective actions taken, including measures to prevent further problems. EWEB will also perform periodic, random site visits throughout the work period, accompanying the full-time inspectors on-site inspections and ensuring thorough inspection and enforcement of environmental measures. EWEB will send email summary reports of these visits to NMFS. EWEB will also enforce the following items from the Pollution and Erosion Control Details and Requirements found in sheet ES-1 of each contract document:

[15]In an email dated April 30, 2002, EWEB amended its proposed action to include these oversight measures.

[16]The Quality Control Inspection Program (QCIP) is a general requirement of FERC, not specific to the Leaburg-Walterville License.

i. Items 2 and 7: Requires the contractor to adjust the approved PECP as required for field conditions,
ii. Item 9: Requires contractor inspection of erosion control facilities after significant rainfall events,
iii. Items 15 and 6: EWEB can halt construction if the contractor is not maintaining proper erosion and pollution control measures and the contractor is responsible for payment of any agency-imposed fines.

*5. To implement Reasonable and Prudent Measure #5 (monitoring), the USACE shall ensure the following:*

a. Construction Monitoring. Within 30 days of completing the project, EWEB will submit a monitoring report to the USACE, DSL, and the Services describing EWEB's success in carrying out the proposed measures to avoid, minimize, and mitigate for construction-related impacts. This report will consist of the following information:
   i. Project identification.
      (1) Applicant's name,
      (2) project name,
      (3) construction activity,
      (4) compensatory mitigation site(s) (if any) by 5th field HUC and latilong,
      (5) starting and ending dates for work performed, and
      (6) EWEB's contact person.
   ii. Isolation of in-water work area. All projects involving isolation of in-water work areas will include a report of any seine and release activity including:
      (1) The name and address of the supervisory fish biologist,
      (2) methods used to isolate the work area and minimize disturbances to ESA-listed species,
      (3) stream conditions prior to and following placement and removal of barriers;
      (4) the means of fish removal,
      (5) the number of fish removed by species,
      (6) the location and condition of all fish released, and
      (7) any incidence of observed injury or mortality.
   iii. Pollution and erosion control. Copies of all pollution and erosion control inspection reports, including descriptions of any failures experienced with erosion control measures, efforts made to correct them and a description of any accidental spills of hazardous materials will be submitted.
   iv. Treated wood pilings. Any project involving removal of treated wood pilings will include the name and address of the approved disposal area and the plan for long-term monitoring to ensure that if altered currents expose more pile, it will also be removed.
   v. Site restoration. Documentation of the following conditions:
      (1) Finished grade slopes and elevations.
      (2) Log and rock structure elevations, orientation, and anchoring, if any.

(3) Planting composition and density.
(4) A plan to inspect and, if necessary, replace failed plantings and structures for a period of five years.

vi. A narrative assessment of the project's effects on natural stream function.

vii. Photographic documentation of environmental conditions at the project site and compensatory mitigation site(s) (if any) before, during and after project completion.
(1) Photographs will include general project location views and close-ups showing details of the project area and project, including pre and post construction.
(2) Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.
(3) Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

# 10. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. NMFS did not identify any conservation recommendations in this biological opinion.

# 11. REINITIATION OF CONSULTATION

This concludes formal consultation on the USACE action described in the BA (USACE 2002) for construction activities at EWEB's Walterville Project. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of incidental take specified in the incidental take statement is exceeded, or is expected to be exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or, 4) a new species is listed or critical habitat designated that may be affected by the action (50 CFR §402.16). In instances where the amount or extent of incidental take specified in the Incidental Take Statement is exceeded, USACE must notify the Services and reinitiate consultation immediately [(50 CFR §402.14(i)(4)].

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# 13. ESSENTIAL FISH HABITAT

## 13.1 Background

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NMFS on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (§305(b)(2));
- NMFS must provide conservation recommendations for any Federal or State action that would adversely affect EFH (§305(b)(4)(A));
- Federal agencies must provide a detailed response in writing to NMFS within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NMFS EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (§305(b)(4)(B)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR §600.10). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR §600.810).

EFH consultation with NMFS is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

## 13.2 Identification of EFH

Pursuant to the MSA, the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of Federally-managed Pacific salmon: chinook (*Oncorhynchus tshawytscha*); coho (*O. kisutch*); and Puget Sound pink salmon (*O. gorbuscha*)(PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically, accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based, in part, on this information.

## 13.3 Proposed Action

The proposed action and action area are detailed above in Section 3 of this biological opinion. The action area includes habitats that have been designated as EFH for various life-history stages of chinook salmon.

## 13.4 Effects of the Proposed Action

As described in detail in Section 6 of this biological opinion, the proposed action may result in short-term adverse effects to a variety of habitat parameters. The proposed action may result in a short-term disturbance of stream bed material, a short-term increase in turbidity and sediment levels, and a temporary reduction in riparian vegetation. Chemical contaminants could enter the river due to the close proximity of the construction staging area to the river, but this risk is low due to implementation of conservation measures described in the action agency's proposed action and the terms and conditions of this biological opinion.

## 13.5 Conclusion

NMFS concludes that the proposed action may adversely affect designated EFH for chinook salmon.

## 13.6 EFH Conservation Recommendations

Persuant to Section 305(b)(4)(A) of the MSA, NMFS is required to provide EFH conservation recommendations to Federal agencies regarding actions which may adversely affect EFH. The conservation measures that the USACE included in the proposed action and all of the Terms and Conditions contained in Section 9.3 of this biological opinion apply to salmon EFH. Consequently, NMFS recommends that they be adopted as EFH conservation measures.

## 13.7 Statutory Response Requirement

Pursuant to the MSA (§305(b)(4)(B)) and 50 CFR §600.920(j), Federal agencies are required to provide a detailed written response to NMFS' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. In the case of a response that is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

## 13.8 Supplemental Consultation

The USACE must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations (50 CFR §600.920(k)).

## 13.9 References

PFMC (Pacific Fishery Management Council). 1999. Amendment 14 to the Pacific Coast Salmon Plan. Appendix A: Description and Identification of Essential Fish Habitat, Adverse Impacts and Recommended Conservation Measures for Salmon. Portland, Oregon.

# APPENDIX A

# CONSTRUCTION SCHEDULE- FERC LICENSE ARTICLE 403

**Project Name:** Leaburg-Walt. Group **Filter:** AAA- Construction for Article 403

| # | Task Name | Start | Finish |
|---|---|---|---|
| 754 | PHYSICAL PLANT SCHEDULE | 03/24/00 | 12/23/03 |
| 765 | Walterville Outage Project SCREEN/DIVERSION | 03/24/00 | 12/23/02 |
| 787 | Construction Phase | 02/13/02 | 12/23/02 |
| 788 | EWEB Issue Notice to Proceed | 02/13/02 | 02/13/02 |
| 789 | Contractor Complete Outage Prepartions | 02/14/02 | 04/30/02 |
| 790 | EWEB Dewater/Fish Salvage | 05/01/02 | 05/14/02 |
| 791 | Contractor Outage Work | 05/20/02 | 10/22/02 |
| 792 | Contractor Complete In-River Work | 07/01/02 | 08/30/02 |
| 793 | Replace Cribbing w/Rock | 07/01/02 | 08/30/02 |
| 794 | Construct Rock Weirs | 07/01/02 | 08/30/02 |
| 795 | Construct Fish Return Outfall | 07/01/02 | 08/30/02 |
| 796 | Complete In-River Work | 08/30/02 | 08/30/02 |
| 797 | Outage Ends | 10/22/02 | 10/22/02 |
| 798 | Contractor Complete Remaining Post Outage Work | 10/23/02 | 12/23/02 |
| 799 | Startup & Testing | 10/23/02 | 12/03/02 |
| 800 | Screen Project Complete | 12/23/02 | 12/23/02 |
| 801 | Walterville Outage Project TAILRACE BARRIER | 03/24/00 | 10/01/02 |
| 823 | Construction Phase | 01/28/02 | 10/01/02 |
| 824 | EWEB Issue Notice to Proceed | 01/28/02 | 01/28/02 |
| 825 | Contractor Complete Outage Prepartions | 01/29/02 | 04/30/02 |
| 826 | EWEB Dewater/Fish Salvage | 05/01/02 | 05/14/02 |
| 827 | Contractor Outage Work | 05/15/02 | 08/30/02 |
| 828 | Contractor Complete In-River Work | 05/15/02 | 08/30/02 |
| 829 | Construct Coffer Dam | 05/15/02 | 05/21/02 |
| 830 | Remove Coffer Dam | 08/26/02 | 08/30/02 |
| 831 | In River Work Ends | 08/30/02 | 08/30/02 |
| 832 | Contract Finishes Work | 09/02/02 | 10/01/02 |
| 833 | Tailrace Barrier Project Complete | 10/01/02 | 10/01/02 |
| 834 | Walterville Outage Project TAILRACE EXCAVATION | 03/24/00 | 11/21/02 |
| 856 | Construction Phase | 01/28/02 | 11/21/02 |
| 857 | EWEB Issue Notice to Proceed | 01/28/02 | 01/28/02 |
| 858 | Contractor Outage Prepartions | 01/29/02 | 04/29/02 |
| 859 | EWEB Dewater/Fish Salvage | 05/01/02 | 05/14/02 |
| 860 | Contractor Construct Outage Work | 05/15/02 | 10/22/02 |
| 861 | Outage Ends | 10/22/02 | 10/22/02 |
| 862 | Contractor Complete Post Outage Work | 10/23/02 | 11/21/02 |
| 863 | Tailrace Excavation Project Complete | 11/21/02 | 11/21/02 |
| 894 | Leaburg Non-Outage Project RB FISH LADDER | 03/24/00 | 11/13/02 |
| 916 | Construction Phase | 01/30/02 | 11/13/02 |
| 917 | EWEB Issue Notice to Proceed | 01/30/02 | 01/30/02 |
| 918 | Contractor Complete Pre In-River Work | 01/31/02 | 05/10/02 |

**09/04/01 10:13 am** **Page 1 of 3**

| # | Task Name | Start | Finish |
|---|---|---|---|
| 919 | Contractor Mobilize & Complete Critical Submittals | 01/31/02 | 03/08/02 |
| 920 | Early Material Procurements | 03/11/02 | 03/29/02 |
| 921 | Construct Erosion Control | 04/01/02 | 04/05/02 |
| 922 | Construct Temp Riverside Access Road | 04/08/02 | 04/26/02 |
| 923 | Construct Temp Fish Return Pipe | 04/29/02 | 05/10/02 |
| 924 | In-River Work | 05/13/02 | 06/11/02 |
| 925 | Temp. Fish Return Pipe, Coffer Dam, DEW System, Boulder Removal | 05/13/02 | 06/11/02 |
| 926 | Ladder & Misc Concrete | 06/12/02 | 09/25/02 |
| 927 | Ladder Concrete | 06/12/02 | 09/11/02 |
| 928 | Fish Return Channel Mods | 09/12/02 | 09/25/02 |
| 929 | Mechanical/Electrical | 09/26/02 | 10/30/02 |
| 930 | Screen/Gate Mechanical | 09/26/02 | 10/16/02 |
| 931 | Electrical | 10/17/02 | 10/30/02 |
| 932 | Final Work | 10/31/02 | 11/13/02 |
| 933 | Remove Coffer Dam | 10/31/02 | 11/06/02 |
| 934 | Ladder Operation Flow Adjustments | 11/07/02 | 11/13/02 |
| 935 | Right Bank Fish Ladder Project Complete | 11/13/02 | 11/13/02 |
| **936** | **Leaburg Non-Outage Project LB FISH LADDER** | **03/24/00** | **10/29/03** |
| **958** | **Construction Phase** | **05/02/03** | **10/29/03** |
| 959 | EWEB Issue Notice to Proceed | 05/02/03 | 05/02/03 |
| 960 | Contractor Construct LB Fish Ladder Improvements | 05/02/03 | 09/12/03 |
| 961 | Contractor Mobilize & Complete Critical Submittals | 05/02/03 | 06/03/03 |
| 962 | Early Material Procurements | 06/03/03 | 06/24/03 |
| 963 | Construct Erosion Control | 06/24/03 | 07/01/03 |
| 964 | Ladder Out of Service | 07/01/03 | 07/01/03 |
| 965 | Concrete Construction | 07/01/03 | 08/15/03 |
| 966 | Mechanical | 08/15/03 | 08/29/03 |
| 967 | Electrical | 08/29/03 | 09/12/03 |
| 968 | Ladder Back in Service | 09/12/03 | 09/12/03 |
| 969 | Final Work | 09/12/03 | 10/29/03 |
| 970 | Finish Grade, Fencing, Recreation Improvements | 09/12/03 | 10/29/03 |
| 971 | Project Complete | 10/29/03 | 10/29/03 |
| **972** | **Leaburg Maintenance Projects - Non-Outage** | **03/24/00** | **09/17/03** |
| **973** | **LEABURG ROLLER GATE IMPROVEMENTS (Internal Reinf)** | **03/24/00** | **09/17/03** |
| 1003 | Construction Phase (2002 & 2003) | 05/02/02 | 09/17/03 |
| 1004 | 2002 Roller Gate Work (No.1) | 05/02/02 | 11/05/02 |
| 1005 | EWEB Issue Notice to Proceed - 2002 Work | 05/02/02 | 05/02/02 |
| 1006 | Contractor Critical Submittals | 05/03/02 | 05/30/02 |
| 1007 | Contractor Procure Critical Materials | 05/31/02 | 08/30/02 |
| 1008 | Install Timber Isolation @ Gate No.1 | 09/02/02 | 09/13/02 |
| 1009 | Modify Gate No.1 (Steel Reinforcing) | 09/16/02 | 10/15/02 |
| 1010 | Paint Gate No.1 & Return to Service | 10/16/02 | 11/05/02 |
| 1011 | 2002-2003 Wet Weather Off Period | 11/06/02 | 05/01/03 |
| 1012 | No Work Period | 11/06/02 | 05/01/03 |

| # | Task Name | Start | Finish |
|---|---|---|---|
| 1013 | 2003 Roller Gate Work (No.2 and No.3) | 05/02/03 | 09/17/03 |
| 1014 | 2003 Install Timber Isolation @ Gate No.2 | 05/02/03 | 05/12/03 |
| 1015 | Modify Roll Gate No.2 (Steel Reinforcing) | 05/13/03 | 06/11/03 |
| 1016 | Paint Roll Gate No.2 & Return to Service | 06/12/03 | 07/02/03 |
| 1017 | Remob for Gate No.3 | 07/03/03 | 07/09/03 |
| 1018 | Install Timber Isolation @ Gate No.3 | 07/10/03 | 07/23/03 |
| 1019 | Modify Roll Gate No.3 | 07/24/03 | 08/22/03 |
| 1020 | Paint Roll Gate No.3 & Return to Service | 08/25/03 | 09/12/03 |
| 1021 | Roll Gate Work Complete | 09/12/03 | 09/12/03 |
| 1022 | Demobilize | 09/15/03 | 09/17/03 |
| **1023** | **Leaburg Non-Outage Project LAKE RAISE** | **09/28/01** | **10/22/03** |
| **1046** | **Construction Phase** | **04/21/03** | **10/22/03** |
| 1047 | EWEB Issue Notice to Proceed | 04/21/03 | 04/21/03 |
| 1048 | Construct Lake Raise Improvements | 04/22/03 | 10/22/03 |
| 1049 | Contractor Mobilize & Complete Critical Submittals | 04/22/03 | 05/26/03 |
| 1050 | Early Material Procurements | 05/27/03 | 06/25/03 |
| 1051 | Construct Erosion Control | 06/26/03 | 07/02/03 |
| 1052 | Construct Lake Raise Improvements- In and Out of River | 07/03/03 | 10/22/03 |
| 1053 | Out of River Work | 07/03/03 | 10/22/03 |
| 1054 | In River Work | 07/03/03 | 08/29/03 |
| 1055 | Lake Raise Improvements Complete | 10/22/03 | 10/22/03 |
| **1056** | **Leaburg Outage Project TAILRACE BARRIER** | **06/08/01** | **11/11/03** |
| **1081** | **Construction Phase** | **03/27/03** | **11/11/03** |
| 1082 | EWEB Issue Notice to Proceed | 03/27/03 | 03/27/03 |
| 1083 | Contractor Outage Prepartions | 03/28/03 | 04/30/03 |
| 1084 | EWEB Dewater/Fish Salvage | 05/01/03 | 05/14/03 |
| 1085 | Contractor Construct Outage Work | 05/15/03 | 10/01/03 |
| 1086 | In-River Work | 04/11/03 | 10/15/03 |
| 1087 | Prep for In-River Work | 04/11/03 | 05/12/03 |
| 1088 | Place Tailrace Coffer Dam | 05/15/03 | 06/04/03 |
| 1089 | Remove Coffer Dam | 10/09/03 | 10/15/03 |
| 1090 | Outage Ends | 10/22/03 | 10/22/03 |
| 1091 | Contractor Complete Post Outage Work | 10/23/03 | 11/11/03 |
| 1092 | Leaburg Tailrace Barried Project Complete | 11/11/03 | 11/11/03 |
| **1093** | **Leaburg Outage Project SCREEN** | **09/28/01** | **12/23/03** |
| **1115** | **Construction Phase** | **04/03/03** | **12/23/03** |
| 1116 | EWEB Issue Notice to Proceed | 04/03/03 | 04/03/03 |
| 1117 | Contractor Outage Prepartions | 04/04/03 | 05/14/03 |
| 1118 | EWEB Dewater/Fish Salvage | 05/01/03 | 05/14/03 |
| 1119 | Contractor Construct Outage Work | 05/15/03 | 10/08/03 |
| 1120 | Outage Ends | 10/22/03 | 10/22/03 |
| 1121 | Contract Complete Remaining Post Outage Work | 10/23/03 | 12/23/03 |
| 1122 | Startup & Testing | 10/23/03 | 12/23/03 |
| 1123 | Screen Project Complete | 12/23/03 | 12/23/03 |

**09/04/01 10:14 am** **Page 3 of 3**